U. S. Government

RESEARCH REPORTS

June 5, 1964
Vol. 39 No. 11

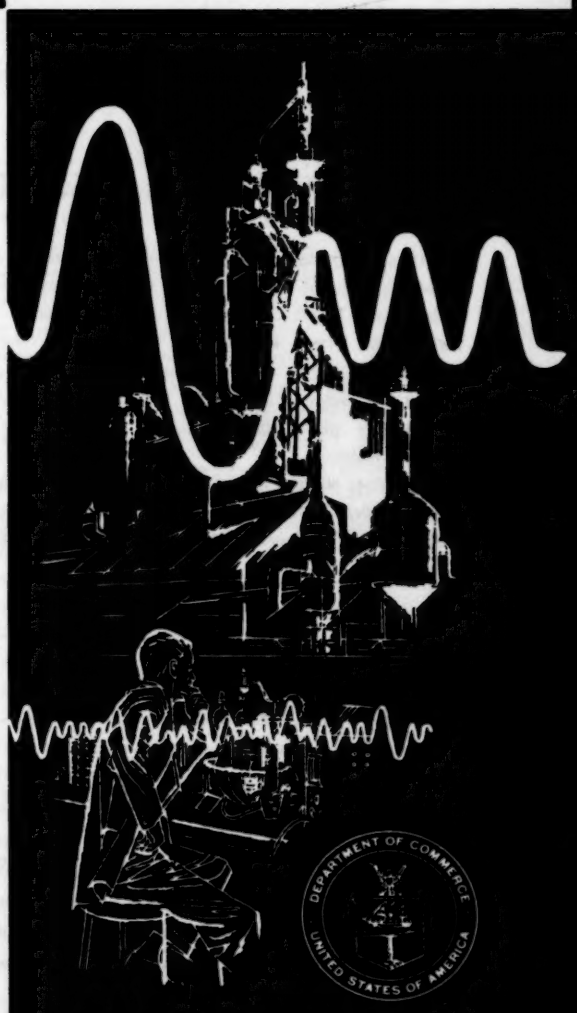
available to

science and industry . . .

The reports listed in this publication, unless otherwise noted, are available from the Office of Technical Services, U.S. Department of Commerce, at the prices indicated. They may also be ordered through Department of Commerce Field Offices.

The Office of Technical Services collects and distributes the research and development reports of the Army, Navy, Air Force, Atomic Energy Commission, and other agencies of the Federal Government for the use of private scientific and industrial firms and organizations in the development of new products and processes and in making technological improvements.

This publication is issued twice a month to announce new material available through the Office of Technical Services, which sells copies of Government reports at the cost of reproduction and handling. For additional information and ordering instructions, see inside of front cover.



U. S. DEPARTMENT OF COMMERCE

Office of Technical Services

U.S. GOVERNMENT RESEARCH REPORTS

U.S. DEPARTMENT OF COMMERCE
Luther H. Hodges, Secretary

OFFICE OF TECHNICAL SERVICES
Donald A. Schon, *Director*

Issued twice a month. Annual subscription $15 ($3.75 additional for foreign mailing). Single copy $1. Make remittance payable to Superintendent of Documents and mail either to a U.S. Department of Commerce Field Office or to Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. Address changes should be sent to Superintendent of Documents.

Contents may be reprinted freely. Mention of source will be appreciated.

Use of funds for printing this publication approved by the Director of the Bureau of the Budget, June 30, 1961.

U.S. Government Research Reports

This publication is issued twice a month to announce new reports of research and development released by the Army, Navy, Air Force, Atomic Energy Commission, and other agencies of the Federal Government. Unless otherwise indicated, reports listed are available from the Office of Technical Services. Some are reproduced by photo-offset printing, others by photocopy reproduction.

The first section of *U.S. Government Research Reports* is compiled by the Defense Documentation Center and is called "Technical Abstract Bulletin." (DDC is a Department of Defense agency which services DOD agencies and their contractors with military research information.) The next section is called "Non-Military and Older Military Research Reports." Here are listed new reports of the Atomic Energy Commission, the Office of Saline Water of the Department of Interior, and reports of other civilian agencies of the Government. In addition, this section lists military research reports not to be found in the "TAB." Most of these older military reports have been acquired by OTS in response to specific industry requests.

How To Order Reports

Almost all reports listed in *U.S. Government Research Reports* are available from the Office of Technical Services, U.S. Department of Commerce, Washington, D.C. 20230, or may be ordered through any Department of Commerce Field Office. Prices are given with each entry. Please use the identification numbers (AD number, PB number, AEC series number) and titles of reports when ordering. Prepayment is required.

For reports available from GPO, address your order and make check or money order payable to Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

When any report is available from a source other than OTS or GPO, the name and address of that source will be given. Direct your order to that address and not to OTS.

MICROFILM—Any reports available from the Office of Technical Services will be provided in microfilm (35 mm.) on request. The following prices are charged for microfilm: 1 through 20 pages, 80 cents minimum; and 3 cents per page for every page in excess of 20 pages.

CONTENTS

PAGE NOS.

NOTICE TO READERS OF THIS BULLETIN.....Inside Front Cover

SUBJECT DIVISIONS

1 AIRCRAFT AND FLIGHT EQUIPMENT..... 1
2 ASTRONOMY, GEOPHYSICS, AND GEOGRAPHY..... 3
3 CHEMICAL WARFARE EQUIPMENT AND MATERIALS..... 12
4 CHEMISTRY..... 13
5 COMMUNICATIONS..... 19
6 DETECTION..... 21
7 ELECTRICAL EQUIPMENT..... 23
8 ELECTRONICS AND ELECTRONIC EQUIPMENT..... 28
9 FLUID MECHANICS..... 48
10 FUELS AND COMBUSTION..... 54
11 GROUND TRANSPORTATION EQUIPMENT..... 55
12 GUIDED MISSILES..... 55
13 INSTALLATIONS AND CONSTRUCTION..... 60
14 MATERIALS (NON-METALLIC)..... 65
15 MATHEMATICS..... 69
16 MEDICAL SCIENCES..... 79
17 METALLURGY..... 88
18 MILITARY SCIENCES AND OPERATIONS..... 93
19 NAVIGATION..... 94
20 NUCLEAR PHYSICS AND NUCLEAR CHEMISTRY..... 95
21 NUCLEAR PROPULSION.....No Entries
22 ORDNANCE..... 98
23 PERSONNEL AND TRAINING..... 101
24 PHOTOGRAPHY AND OTHER REPRODUCTION PROCESSES..... 103
25 PHYSICS..... 105
26 PRODUCTION AND MANAGEMENT..... 124
27 PROPULSION SYSTEMS..... 126
28 PSYCHOLOGY AND HUMAN ENGINEERING..... 130
29 QUARTERMASTER EQUIPMENT AND SUPPLIES..... 132
30 RESEARCH AND RESEARCH EQUIPMENT..... 133
31 SHIPS AND MARINE EQUIPMENT..... 144
32 MISCELLANEOUS ARTS AND SCIENCES..... 146
33 TRANSPORTATION..... 148

SUBJECT INDEX..... NI-1

CONTENTS (CON.)

NON-MILITARY AND OLDER MILITARY RESEARCH REPORTS

	Page
AGRICULTURE	S-1
ASTRONOMY	S-1
BEHAVIORAL SCIENCES	S-1
BIOLOGICAL SCIENCES	S-2
CHEMISTRY	S-7
EARTH SCIENCES	S-10
ENGINEERING	S-11
FOOD, HANDLING, AND PACKAGING EQUIPMENT	S-24
MACHINERY, FABRICATION, AND ACCESSORY EQUIPMENT	S-24
MATERIALS	S-25
MATHEMATICS	S-30
MECHANICS	S-32
METALLURGY	S-35
NUCLEAR PHYSICS AND NUCLEAR CHEMISTRY	S-40
PHYSICS	S-51
SOCIAL SCIENCES	S-57
AD INDEX	S-59
NUMBER INDEX	S-61
SUBJECT INDEX	S-65

This issue includes:

TAB 64 - 11

AD 433 300 - AD 435 099

FEDERAL REGIONAL TECHNICAL REPORT CENTERS

Each of the Federal Regional Technical Report Centers listed below contains a collection of USAEC, NASA, and DOD unclassified reports as well as reports of other U. S. government agencies and provides reference, interlibrary loan, and reproduction services.

University of California
General Library
Berkeley, Calif. 94704

University of California
University Library
Los Angeles, Calif. 90024

Library of Congress
Science and Technology Division
Washington, D. C. 20540

Georgia Institute of Technology
Price Gilbert Library
Atlanta, Ga. 30300

The John Crerar Library
35 West 33rd St.
Chicago, Ill. 60616

Massachusetts Institute of Technology
M. I. T. Libraries
Cambridge, Mass. 02139

Linda Hall Library
5109 Cherry Street
Kansas City, Mo. 64100

Columbia University
Engineering Library
Seeley W. Mudd Building
New York, N. Y. 10027

Carnegie Library of Pittsburgh
4400 Forbes St.
Pittsburgh, Pa. 15213

Southern Methodist University
Science Library
P. O. Box 1339
Dallas, Tex. 75222

University of Colorado
Boulder, Colo. 80301

University of Washington Library
Government Documents Center
Seattle, Wash. 98105

Some PB reports listed as available from OTS may be examined at the following libraries:

Buffalo and Erie County Public Library
Buffalo, N. Y. 14200

University of Cincinnati
Cincinnati, Ohio 45200

Detroit Public Library
Detroit, Michigan 48200

University of Utah
Salt Lake City, Utah 84100

The following Cumulative Indexes for U. S. Government Research Reports are available from the Superintendent of Documents, Government Printing Office, Washington, D. C., 20402:

Volume 32	July - December 1959	$1.00
Volume 33	January - June 1960	$1.00
Volume 34	July - December 1960	$1.00
Volume 35	January - June 1961	$1.00
Volume 36	July - December 1961	$3.50
Volume 37	Semi-annual Cumulative Index January - June 1962 Includes both Technical Abstract Bulletin (TAB) and "Non-Military and Older Military Reports" sections.	$3.50
Volume 37	Semi-annual Cumulative Index July - December 1962 Includes Technical Abstract Bulletin only.	$3.50
Volume 37	Annual Cumulative Index January - December 1962 Includes "Non-Military and Older Military Research Reports" section only.	$1.00
Volume 38	Collective Index 1 January - 1 May 1963 Includes Technical Abstract Bulletin only.	$3.50

For information regarding the availability of earlier indexes write to Office of Technical Services, U. S. Department of Commerce, Washington, D. C. 20230.

TECHNICAL ABSTRACT BULLETIN

1. AIRCRAFT AND FLIGHT EQUIPMENT

AD-433 586 Div. 1
OTS price $1.50

Research and Technology Div., Air Force Systems Command, Edwards, Calif.
STATIC TEST PROGRAM FOR CH-47A HELICOPTER.
Final rept.,
by Robert L. Schneider. Dec 63, 59p.
Proj. 1443, Task 14060
RTD TDR63 4230 Unclassified report

Descriptors: (*Helicopters, Airframes), (*Airframes, Helicopters), Loading (Mechanics), Captive tests, Stresses, Structures, Test methods.

Results of structural tests conducted on the complete airframe of the Vertol CH-47A helicopter are reported for all critical flight, landing, take-off, and ground handling conditions. Two critical test conditions for growth potential are also presented. The structure of the Vertol CH-47A helicopter, with the exception of the litter and troop seat installations, was capable of withstanding the static ultimate loads generated by 71 different test conditions. (Author)

AD-433 683 Div. 1
OTS price $5.60

Aviation Safety Engineering and Research, Phoenix, Ariz.
CH-21A HELICOPTER AIRFRAME DEFORMATION UNDER A DYNAMIC CRASH CONDITION,
by Williana H. Reed and Donald F. Carroll.
Jan 64, 52p. Technical rept. no. AvSER63 3
Contract DA44 177AMC888T, Task 1A024701A12101
ATRECOM TR63 77 Unclassified report

Descriptors: (*Helicopters, Aviation accidents), (*Airframes, Deformation), Simulation, Damage, Failure (Mechanics), Nose wheels, Landing gear, Cockpits, Fuselages, Fuel tanks, Hazards, Aircraft cabins, Aviation safety.

An obsolete U. S. Army CH-21A helicopter was remotely controlled to a crash designed to simulate a known accident configuration. Observations of airframe deformation which resulted are reported to convey an understanding of the type and severity of damage to be expected to occur in a moderately severe accident involving an aircraft of this type. Conclusions and recommendations to improve the crashworthiness of aircraft of this type are presented. (Author)

AD-433 703 Div. 1, 9
OTS price $8.10

Federal Aviation Agency, Washington, D. C.
AN EVALUATION OF THE EFFECTS OF ALTITUDE ON THE HEIGHT VELOCITY DIAGRAM OF A SINGLE ENGINE HELICOPTER,
by William J. Hanley and Gilbert DeVore. Feb 64, 83p.
Proj. 343 010 01V
FAA ADS1 Unclassified report

Descriptors: (*Helicopters, Flight testing), Instrumentation, Test methods, Airspeed, Airplane landings, Acceleration, Terrain, Rotation, Aviation safety, Landings, Density, Air, Helicopter rotors, Wind, Weight, Low altitude, Velocity, Height finding, Pilots, Public opinion.

The effects of altitude on the height-velocity H-V) diagram for a light-weight, single-engine helicopter were investigated at four selected altitudes (sea level, 4000 ft., 7000 ft, and 10,000 ft.) and three gross weights (2415 lbs., 2650 lbs., and 2850 lbs.). Quantitative and qualitative information was collected to determine how the height-velocity diagram varies with density altitude and also to determine a means of calculating the height-velocity diagrams for various density altitudes from flight test data recorded at one density altitude. Flight test results disclosed a family of curves showing that increases in either density altitude or gross weight incrased either the airspeed or the height above ground required for safe operation. From these empirical curves, linear equations were derived which express the relationship of critical points of the height-velocity diagram of the test helicopter for various gross weights and operating altitudes. (Author)

AD-433 785 Div. 1, 9
OTS price $7.60

Vehicle Research Corp., Pasadena, Calif.
VORTEX RECIRCULATION LIFT FOR GROUND EFFECT MACHINES,
by T. Fujita, W. Bettes and G. Wiederkehr.
31 Dec 63, 78p. Rept. no. 17
Contract Nonr3802 00
Unclassified report

Descriptors: (*Ground effect machines, Lift), Vortices, Configuration, Theory, Optimization, Fans, Test equipment, Tests.

A vortex recirculation lift system for use on ground effect machines (GEMs) demonstrated that (1) the deformed vortex flow pattern can be generated and sustained, (2) the pressure developed by the small test arrangement exceeds base pressures currently employed on peripheral jet GEMs, (3) the hovering power requirements of the extremely non-optimum test unit are of the order of conventional peripheral jet GEMs indicating that a refined vortex recirculation system will greatly surpass current GEM lift systems, and (4) an inherently stable configuration might be evolved since powerful stabilizing moments were obtained by simple variations in geometry. This effort confirms prior theoretical work and provides a feedback which focuses on extensions and refinements to the theory. (Author)

Division 1 - AIRCRAFT AND FLIGHT EQUIPMENT

AD-434 183 Div. 1
OTS price $1.10

Aeronautical Materials Lab., Naval Air Engineering Center, Philadelphia, Pa.
THE DEVELOPMENT OF A NEW TYPE MASKING COMPOSITION FOR O&R OPERATIONS,
by A. J. Koury. 11 Mar 64, 2p.
NAEC AML 1901 Unclassified report

Descriptors: (*Protective treatments, Aircraft finishes), (*Aircraft finishes, Protective treatments), Airplane panels, Test methods, Plating, Paints, Petroleum, Coatings.

AD-434 300 Div. 1, 11
OTS price $11.00

Princeton U., N. J.
THE GENERAL CHARACTERISTICS OF WINGED GROUND EFFECT MACHINES,
by D. R. Summers, G. P. Carr, J. J. Metzko, W. B. Nixon and A. F. Wojciechowicz,Jr. Oct. 63, 148p.
Rept. no. 657
Contract DA44 177TC833, Task 1D121401A14203
TRECOM TR63 36 Unclassified report

Descriptors: (*Ground effect machine, Wings), Maneuverability, Lift, Drag, Stability, Performance (Engineering).

Performance and stability advantages were determined for the addition of wings to a ground effect machine. The work is both theoretical and experimental, the later being accomplished both with models and a winged version of the full scale Curtiss-Wright Air Car. Results indicate that substantial gains in both performance and stability are attainable by such a hybrid machine when compared to the pure GEM. For the high speed cruise condition, wings will be found most beneficial if the base loading of the craft is not excessive. (Author)

AD-434 302 Div. 1, 18
OTS price $1.60

Engineering Development Lab., Naval Air Development Center, Johnsville, Pa.
STRENGTH ANALYSIS OF THE NAVAIRDEVCEN C.G. TARGET LAUNCHER.
Final rept.,
by Seymour Z. Lobel. 18 Mar 64, 13p.
NADC ED 6408 Unclassified report

Descriptors: (*Jet fighters, Towed bodies), (*Aerial targets, Attachment), Gravity, Aircraft protuberances, External stores, Launching, Recovery, Subsonic characteristics, Aerodynamic loading, Loading (Mechanics), Distribution, Stresses, Flight testing, Acceptability, Design, Aerodynamic characteristics, Adapters, Structures, Structural parts, Wings.

A structural analysis is presented for the LAU-37/A center-of-gravity (c.g.) launcher and associated wing fitting adapters for F-8 aircraft. The adapters are designed for interchangeable employment of an LAU-37/A or Aero 38B launcher. The LAU-37/A launcher is designed for carrying, launching, and recovering TA-7, -5T, and TDU-22/B type c.g. -towed targets with F-8 aircraft. (Author)

AD-434 799 Div. 1, 12
OTS price $2.50

Systems Technology, Inc., Inglewood, Calif.
ANALYSIS OF MULTILOOP VEHICULAR CONTROL SYSTEMS,
by D. T. McRuer, I. L. Ashkenas and H. R. Pass.
Mar 64, 113p.
Contract AF33 616 8024, Proj. 8219, Task 821905
ASD TDR62 1014 Unclassified report

Descriptors: (*Flight control systems, Mathematical analysis), (*Automatic pilots, Mathematical analysis), Determinants, Servomechanisms, Stability, Matrix algebra, Feedback.

The multiloop vehicular control system analysis technique is designed to maximize the transfer to the multiloop problem of knowledge and insights obtained from elementary single-loop vehicular control system analyses. The matrices representing the closed-loop multiloop system are expanded in a special fashion to forms in which the elementary single-loop systems explicitly appear. In the course of the development, the concept of the vehicle coupling numerator is introduced as an additional property of vehicle response behavior. The over-all closed-loop system analysis consists of successive closures of single, elementary system loops and loops involving vehicle transfer function numerators and coupling numerators. (Author)

AD-434 800 Div. 1, 20, 15, 30, 22
OTS price $2.60

Naval Weapons Evaluation Facility, Albuquerque, N. Mex.
AN ANALYSIS OF THE TEMPERATURE-TIME DATA OBTAINED FROM A STEEL CYLINDER ENGULFED BY AN AIRCRAFT-FUEL FIRE,
by Albert C. Giere. 29 Feb 64, 22p.
NAVWEPS 8292 Unclassified report

Descriptors: (*Nuclear weapons, Aircraft fires), (*Aircraft fires, Nuclear weapons), Vulnerability, Fourier analysis, Mathematical prediction, Temperature, Time, Cylindrical bodies, Model tests, Experimental data, Correlation techniques, Theory, Heat transfer.

An analytical method is presented for predicting the temperature-time history of an effectively infinite solid cylinder engulfed by a large, open, aircraft-fuel fire. Essentially, the method consists of the solution of the Fourier heat conduction equation for two different modes of heat transfer to the surface of the cylinder. When the fire temperature and the variations in it are known, the a priori prediction by use of the analytical method can be accurate to within 25 centigrade degrees. (Author)

AD-434 862 Div. 1, 12
OTS price $6.60

Army Missile Command, Redstone Arsenal, Huntsville, Ala.
DEVELOPMENT OF PURE FLUID MISSILE CONTROL SYSTEM.
Summary rept. for FY 62,
by B. J. Clayton, J. G. Williams and J. L. Byrd.
28 Oct 63, 70p.
DA Proj. 1B2 22901A204
AMC RA RG TR62 7, ed. 2 Unclassified report

Descriptors: (*Fluid flow, Amplifiers), Thrust vector control systems, Rocket motor nozzles, Exhaust gases, Secondary injection, Flight control systems, Oscillators, Pressure, Analog systems, Control systems, Theory, Pneumatic devices.

Pure fluid devices are those which utilize fluid flow to perform functional operations such as amplification, addition, integration, logic operations, position sensing, rate sensing and

acceleration sensing. This is achieved by such methods as vectoring a large mass flow of fluid with a smaller mass flow of fluid, sensing pressure drops across fixed orifices, and altering flow patterns in response to external forces. In the United States two basic approaches are under consideration. The work at Diamond Ordnance Fuse Laboratory has been principally in the area of flow control through the use of impinging jets which shows a great potential; the second approach uses a selective porting technique which requires moving parts. DOFL demonstrated in the first half of 1959 the feasibility of fluid amplification. Since then they have experimented with and developed several types of pneumatic devices including bistable amplifiers, linear amplifiers, oscillators, wave-shape generators, etc. With the increased interest in this country in the pure pneumatic field several companies and universities are actively engaged in the design, development, application, and manufacture of numerous types of pure fluid components and subsystems. (Author)

AD-434 995 Div. 1
OTS price $1.60

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
STRUCTURAL DAMPING OF OSCILLATIONS OF THIN-WALLED SHELLS OF TYPE OF HOUSING COMPONENTS OF GAS TURBINE ENGINES,
by A. M. Soyfer and V. P. Filekin. 6 Dec 63, 14p.
FTD MT63 131 Unclassified report

Trans. from Izvestiya Vysshikh Uchebnykh Zavedeniy, MVO SSSR, Seriya 'Aviatsionnaya Tekhnika,' No. 1, pp. 158-164, 1958.

Descriptors: (*Damping, Jet engines), (*Gas turbines, Damping), Aircraft engines, Oscillation, Vibration, Resonance, Structural shells.

Damping was investigated by means of the introduction into the structure of distributed external resistances with use of natural elements of the actual construction. Such a method may be called structural damping, whose main features are: (1) damping will be attained by means of external resistances appearing in compound elements of the construction during its oscillation; (2) damping of oscillations is realized by distributed (along surface of elements of construction) forces of resistances; and (3) for creation of damping effect, natural elements of the construction are used. (Author)

2. ASTRONOMY, GEOPHYSICS AND GEOGRAPHY

AD-433 600 Div. 2
OTS price $10.10

Travelers Research Center, Inc., Hartford, Conn.
PROGNOSTIC RELATIONS DEVELOPED BETWEEN CIRCULATION VARIABLES AND TOTAL CLOUD AMOUNT BY STATISTICAL METHODS,
by Frederick P. Ostby and Donald A. Chisholm. Mar 64, 126p.
Contract AF19 628 3357
ESD TDR64 61 Unclassified report

Descriptors: (*Clouds, Weather forecasting), Cloud cover, Statistical analysis, Mathematical prediction, Data.

For predicting total cloud amount, screening-regression equations (12-, 24-, and 36-hr predictions) and multiple-discriminant-analysis (MDA) probability tables (24-hr prediction only) were derived by statistical methods from a 5-day sample of upper-air analyses and prognoses from Feb. 1962. Significant predictors were found to be total-cloud-amount persistence, moisture content (CPS), vertical velocity, 850-500-mb thickness, 500-mb height, wind divergence, thickness advection, and zonal and meridional wind components. Relations were derived to include prognostic terms only, lagged-analysis terms only, and a combination of the two. Application of the relations to the dependent data and to a small sample (194 cases) of independent data showed that: (a) relations based on prognostic variables and persistence (as predictors) are superior to the others; (b) MDA yields slightly better results than screening regression; (c) relations derived for cloud specification, when converted to prediction relations, do not yield as satisfactory results as prognostic relations; and (d) the statistical techniques yield results superior (based on percent-correct scores on independent data) to persistence or climatology. (Author)

AD-433 608 Div. 2, 25, 20, 30
OTS price $2.60

Aerospace Information Div., Washington, D. C.
PHENOMENA IN THE UPPER ATMOSPHERE. COMPILATION OF ABSTRACTS FROM SOVIET LITERATURE.
Monthly rept. no. 40,
24 Mar 64, 18p.
AID P64 15 Unclassified report

Descriptors: (*Upper atmosphere, Abstracts), Astrophysics, Solar radiation, Ionosphere, Recombination reactions, Radioactivity, Radioactivity, Radiological contamination, Nuclear explosions, Terrestrial magnetism, Van Allen radiation belt, Geophysics, Thermodynamics, Irreversible processes, Solar flares, Plasma physics.

AD-433 632 Div. 2
OTS price $5.60

RCA Defense Electronic Products, Burlington, Mass.
STUDY OF TACTICAL ARMY AIRCRAFT (TAALS). TASK 1 - ATMOSPHERIC STUDIES.
Rept. no. 3 (Final),
by H. D. Eckhardt and J. S. Newell. 31 Jan 64, 56p.
Contract DA36 039AMC03367E, Proj. 1G6 20801A137 03
Unclassified report

Supplement to quarterly progress rept. no. 2, 1 Nov 63-31 Jan 64, AD-433 631.

Descriptors: (*Atmosphere, Scientific research), Mathematical models, Sound transmission, Electromagnetic waves, Signals, Meteorological parameters, Army aircraft, Snow, Rainfall, Fog, Atmospheric refraction, Wind, Turbulence.

Models of severe atmospheric conditions in the lowest 200 feet of the atmosphere were devised and tabulated. These models were chosen as representing the most severe conditions with regard to sonic, electromagnetic, and nuclear signal transmission, which are likely to be encountered in the tactical operation of army aircraft. These models were devised following an intensive literature survey of record precipitation and other meteorological conditions. (Author)

Division 2 - ASTRONOMY, GEOPHYSICS AND GEOGRAPHY

AD-433 641 Div. 2
OTS price $1.60

Geophysics Corp. of America, Bedford, Mass.
CONSIDERATIONS ON ANALYSIS OF ATMOSPHERIC STRUCTURE DATA WITH EMPHASIS ON THE COMPUTATION OF THE ANGULAR DISTANCE FROM THE SUB-SOLAR POINT,
by Lennart R. Peterson and Raymond A. Minzner.
Jan 64, 15p. Technical rept. no. 64 1A, Scientific rept. no. 4
Contract AF19 628 1633, Proj. 7673, Task 76731
AFCRL 64 232 Unclassified report

Descriptors: (*Upper atmosphere, Density), (*Atmospheric sounding, Corrections), Time, Sun, Earth, Astronomy.

AD-433 672 Div. 2
OTS price $5.60

McGill U. (Canada).
RADIATION BALANCE OF THE TROPOSPHERE AND OF THE EARTH-ATMOSPHERE SYSTEM IN THE ARCTIC,
by E. Vowinckel and Svenn Orvig. Jan 64, 51p.
Publication in Meteorology no. 63, SR9
Contract AF19 604 7415, Proj. 8623, Task 862303
AFCRL 64 35 Unclassified report

Descriptors: (*Troposhere, Heat transfer), Energy, Polar regions, Atmosphere, Cloud cover, Gain, Earth, Surfaces, Water, Absorption, Clouds, Cloud height indicators, Albedo, Diffusion, Reflection, Cirrus clouds.

The radiation terms not previously discussed are first calculated - these are short wave radiation absorbed in the atmosphere and upward long wave radiation loss to space. The results are then presented, first the radiation balance of the troposphere and next the balance for the system earth-atmosphere. The monthly values of the various components of the radiation balance are illustrated and discussed for characteristic geographical points. Monthly maps of radiation balance (earth-atmosphere) are presented and discussed. (Author)

AD-433 679 Div. 2, 30
OTS price $8.60

Texas Instruments, Inc., Dallas.
BROADBAND DIGITAL SEISMOMETER EVALUATION.
Final rept.,
by H. L. Lake. 21 Feb 64, 98p.
Contract AF19 628 2986, Proj. 8652, Task 865205
AFCRL 64 33 Unclassified report

Descriptors: (*Seismographs, Digital systems), (*Digital systems, Broadband), Velocity, Dynamics, Experimental data, Analysis, Instrumentation, Signals, Linear systems, Noise, Detection, Identification systems.

Ambient seismic noise and several large earthquakes were recorded at the same location using both velocity-and displacement-sensing seismograph systems. These data were evaluated for information content by application of convolution filters designed to map outputs from the broadband instruments into the outputs of conventional narrow band systems and into each other. The broadband displacement seismometer was tested for static and dynamic linearity and the response determined from shake table measurements. The velocity instrument was constructed, with minor modifications, from off-the-shelf components. The necessary dynamic range for the two types of broadband seismometer systems was examined and studies were carried out to determine the effictveness of both types for broadband recordings. Several uses of broadband systems are examined and examples of the contributions that could be made to detection and identification of seismic events are discussed. (Author)

AD-433 709 Div. 2
OTS price $1.10

California U., Berkeley.
(No title).
Final rept. 1 Oct 62-30 Sep 63,
by R. R. Brown. Mar 64, 7p.
Grant AF AFOSR62 422
AFOSR 424 Unclassified report

Descriptors: (*Cosmic rays, Scientific research), Balloons, Balloon equipment, Ionospheric propagation, Absorption, Solar radiation, Protons, Alpha particles, Analysis, Emissivity, Electron bombardment, X-rays.

AD-433 731 Div. 2
OTS price $9.10

General Dynamics Astronautics, San Diego, Calif.
WEATHER SATELLITE DATA PROCESSING.
Final rept. Aug 61-Jan 64.
by Walter A. Marggraf. Jan 64, 107p. Rept. no. A DBB64 002
Contract AF19 604 8861, Proj. 6698, Task 669802
AFCRL 64 62 Unclassified report

Descriptors: (*Weather stations, Satellites (Artificial)), (*Satellites (Artificial), Weather stations), (*Meteorological satellites), Data processing systems, Mosaics (Light-sensitive), Video signals, Infrared radiation, Correlation techniques, Analysis.

This final report describes the result of the Meterological Satellite Data Processing Study. Three working areas are documented: 1) automatic mosaicing of rectified TIROS video data, 2) infrared visual correlation of TIROS radiometer data, and 3) analysis of cloud distribution from TIROS rectified mosaics. Examples of rectified mosaics at different resolutions for seven selected TIROS orbits are included. (Author)

AD-433 743 Div. 2
OTS price $2.60

Naval Air Station, Norfolk, Va.
A HISTORICAL SURVEY OF STATISTICAL WEATHER PREDICTION,
by Thomas H. R. O'Neill. 16 Dec 63, 30p.
NWRF 41 1263 087 Unclassified report

Descriptors: (*Weather forecasting, Statistical analysis), (*Meteorology, Bibliographies), Periodic variations, History.

This work presents the history of the use of statistics in weather forecasting and describes the evolution of the more important statistical methods in this field: graphical techniques, periodicity, empirical orthogonal functions, and multiple discriminant analysis. A bibliography consisting of 141 references, divided by topics, and an appendix listing these references chronologically are included. (Author)

AD-433 777 Div. 2
OTS price $1.60

Texas A and M Coll., College Station.
A STUDY TO IMPROVE THE LOW-LEVEL METEOROLOGICAL SIMULATOR.

Quarterly progress rept. no. 4, 1 Sep-30 Nov 63.
by William H. Clayton. 15 Dec 63, 17p. Rept. no. 63 33T
Contract DA36 039AMC02195 E, Proj. 346, Task 3A99 27 005 04 05
Unclassified report

Descriptors: (*Simulation, Meteorology), (*Meteorology, Simulation), Meteorological instrumentation, Low altitude, Analog computers, Model tests, Fog, Jets, Wind, Measurements, Data processing systems.

The purpose of this study is to improve the model utilized in the Low-Level Meteorological Simulator previously developed for the Signal Corps, and to investigate extension of this model particularly with regard to inclusion of fog and low-level jet phenomena. The bulk of the project activities during the current reporting period was associated with simulation efforts, field activities devoted to high-response wind measurements, and completion of the data-processing portion of the Dallas Tower program. Details of these activities as well as those related efforts are reviewed. (Author)

AD-433 778 Div. 2, 25
OTS price $3.60

Hamburger Sternwarte, (Germany).
BRIGHTNESS AND STRUCTURE OF THE NA-EMISSION IN COMETS THE HEADS OF COMETS AND THE LIFETIMES OF THEIR MOLECULES,
by K. Wurm. 1 Aug 63, 32p. Technical note no. 2
Contract AF61 052 583
AFCRL 64 82 Unclassified report

Descriptors: (*Comets, Brightness), Sodium, Solar radiation, Ionization, Absorption spectrum, Molecular spectroscopy.

AD-433 786 Div. 2
OTS price $2.60

Instituto Geofisico De Huancayo, Lima, (Peru).
PRELIMINARY MEASUREMENT OF H-ALPHA FLARE SPECTROGRAMS,
by Mutsumi Ishitsuka, Osamu Takahashi, Francisco Dominguez Vigo, Wilma Gonzales de Dominguez and Enrico Mattievich. Feb 63, 22p.
Contract AF49 638 637
Unclassified report

Descriptors: (*Spectrum analyzers, Solar flares), Hydrogen, Line spectrum, Microphotometers, Collimators.

AD-433 787 Div. 2
OTS price $3.60

Instituto Geofisico De Huancayo, Lima (Peru).
ON THE CENTER-LIMB EFFECT OF SOLAR FLARE AREA,
by Osamu Takahashi. 1962, 40p.
Contract AF49 638 637
Unclassified report

Descriptors: (*Solar flares, Measurement), Distribution, Geometry.

The visual flare area has been corrected. As the result of this correction, however, great discrepancy was brought into the distribution of flare area with respect to central distance on disk, and this discrepancy has been explained as due to the flare height. This paper gives an actual proof of the existence of two different parts in the foreshortening effect of flare visual area and then gives the normalized correction of flare area, from the distribution of the flare counted number with respect to the central distance on disk. (Author)

AD-433 788 Div. 2, 25
OTS Price $3.60

Instituto Geofisico De Huancayo, Lima, (Peru).
SPECTROPHOTOMETRIC OBSERVATIONS OF SOLAR FLARES (PART I). RESULTS FROM THE VISUAL OBSERVATION OF SOLAR ACTIVITY (PART II).
Final progress rept.
by Mutsumi Ishitsuka. July 63, 35p.
Contract AF49 638 637
Unclassified report

Descriptors: (*Solar flares, Spectrophotometers), Analysis, Microphotometers, Collimators, Sunspots.

AD-433 789 Div. 2
OTS price $1.60

Instituto Geofisico del Peru, Lima.
STATISTICS OF SOLAR FLARES,
by Osamu Takahashi. 1962, 19p.
Contract AF49 638 637
Unclassified report

Descriptors: (*Solar flares, Statistical analysis), Solar disturbances, Sunspots, Solar spectrum.

Information is provided on various characteristics of solar flares, by means of statistical methods, to help in a better theoretical understanding of them. The solar flare's lifetime, area, H-alpha width, development curve, associated filament activation and associated sunspot group characteristics are all analyzed for each of 685 flares observed. Correlation of these parameters with one another and with flare importance and Solar Activity is shown, as well as the frequency distribution. (Author)

AD-433 794 Div. 2
OTS price $3.60

Army Cold Regions Research and Engineering Lab., Hanover, N. H.
FORMATION OF LAKE ICE IN A TEMPERATE CLIMATE,
by Richard H. Ragle. Aug 63, 31p.
Proj. 8 66 02 400
CRREL RR107 Unclassified report

Descriptors: (*Ice, Lakes), Bubbles, Crystal growth.

The formation of lake ice in a temperate continental climate was studied during the winter of 1956-1957 at Post Pond, Lyme, New Hampshire. In the thirty-six blocks of ice studied, four textures and three structures were observed. The textures, tabular, columnar, granular, and crenulate, are discussed in terms of relative growth velocity. The structures were Forel striations, Tyndall figures, and bubbles. Strain shadows, a structural feature, were also observed. The average crystal area increased with increasing ice thickness. Generally the rate of increase was greater toward the center of the lake. However, within a pronounced bubble layer, which was continuous through a horizontal plane in the lake-ice sheet, the average crystal area ceased to enlarge. (Author)

AD-433 799 Div. 2, 15, 30
OTS price $7.60

Kansas State U., Manhattan.
PROBABILITY OF SEQUENCES OF WET AND DRY DAYS IN KANSAS,

by A. M. Feyerherm and L. Dean Bark. 1964, 78p.
Contract cwb10646
Unclassified report

Descriptors: (*Atmospheric precipitation, Probability), (*Rainfall, Mathematical prediction), (*Tables, Rainfall), Weather stations, Programming languages.

This bulletin deals with rainfall accumulations for 24-hour periods so that the tabled data can be applied to problems involving periods of less than one-week duration. For a given location, the probabilities found in the tables may be used for determining average economic gains or losses from the occurrence of various patterns of wet and dry days. Situations in which such rainfall patterns may be a dominant factor in determining outcomes are: (1) field drying of hay, (2) germination of seeds, (3) disease susceptibility in periods of plant growth, (4) time requirements for completion of construction projects, and (5) outdoor community activities such as fairs, parades, athletic events, etc. (Author)

AD-433 832 Div. 2
OTS price $3.60

Michigan Univ., Ann Arbor, Coll. of Engineering.
AN INVESTIGATION OF ATMOSPHERIC TURBULENT TRANSFER PROCESSES OVER WATER: INSTRUMENTATION,
by Floyd C. Elder and Donald J. Portman. Nov 63, 31p. Rept. no. 05677 1F; 1
Contract Cwb10591, ORA Proj. 05677
Unclassified report

Descriptors: (*Meteorological instruments, Design), Weather stations, Meteorological paramenters, Wind, Temperature, Water vapor, Measurement, Atmospheric motion, Turbulence, Water, Recording systems, Probes (Electromagnetic).

A facility for measurement of wind, temperature, and water vapor profiles over the surface of Lake Michigan was established. The tower facility is located one mile from shore in 50 foot water depth. Instrumentation employed for measurement and recording of the above variables is described. (Author)

AD-433 911 Div. 2
OTS price $3.60

Weather Bureau, Washington, D. C.
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION PROJECT NO. R-55.
Final rept.,
by J. T. Lee. Aug 63, 36p.
Unclassified report

Report on National Severe Storms Project.

Descriptors: (*Storms, Radar echo areas), (*Flight paths, Thunderstorms), Meteorological parameters, Turbulence, Atmospheric motion, Air traffic, Aircraft, Penetration, Gust loads.

AD-433 912 Div. 2
OTS price $5.60

Travelers Research Center, Inc., Hartford, Conn.
WEATHER RADAR TECHNIQUE DEVELOPMENT.
Final rept., 1 July 63-1 Feb 64,
by Edwin Kessler, III. Feb 64, 57p. Rept. no. 7457 113
Contract Cwb10709
Unclassified report

Descriptors: (*Atmospheric precipitation, Measurement), (*Radar equipment, Weather stations), (*Meteorological radar, Weather stations), Rainfall, Snow, Experimental data, Radar echo areas, Intensity, Thunderstorms, Statistical analysis, Correlation techniques, Digital recording systems.

Quantitative data collected with the WSR-57 radar at Atlantic City from five rainstorms and two snowstorms are compared with precipitation data from 60 recording rain gages within 100 mi of the radar. Hourly rainfall amounts of from 0.01-0.02 in. are detected by the radar in at least 95 per cent of the cases at all radar ranges out to 70 mi. Hourly amounts of from 0.04-0.05 in. are detected in at least 95% of the cases at all ranges out to 100 mi. The relationship between radar echo intensity and rainfall rate varies from storm to storm. Although the radar appears to have excellent potential for determination of area-average rainfall, reflectivity measurements provide only coarse estimates of point rainfall intensity. (Author)

AD-433 974 Div. 2
OTS price $2.60

Geo-Science, Inc., Alamogordo, New Mexico.
SOLAR RESEARCH AND DEVELOPMENT ACTIVITIES AT SACRAMENTO PEAK OBSERVATORY.
Final rept., 1 Jan 61-31 Dec 63.
Jan 64, 23p.
Contract AF19 604 7993, Proj. 7649, Task 764901
AFCRL 64 51 Unclassified report

Descriptors: (*Solar spectrum, Gases), Solar flares, Spectra (Infrared), Infrared spectroscopy, Sunspots, Instrumentation, Astronomical observatories, Control systems.

The research work included studies of the spectra of various solar gaseous materials and investigations of observed peculiarities. An intensified effort was begun on the problem of predicting solar flares successfully near the maximum of a sunspot cycle. The electronics research and support group was active in the extensive instrumentation development program of the observatory. This program included the testing and modification of new instruments to integrate them into existing systems and to meet the requirements of the observing programs, the mechanization of the observatories for maximum efficiency with automatic controls, remote controls, and alarm systems. Many improvements were made to the data reduction systems with such innovations as a Recording Doppler Comparator. Research programs on electronic systems for the design of the newest and most advanced instrumentation planned for the observatory, a tower-mounted, mirrored vacuum telescope, were begun early in 1963. (Author)

AD-434 009 Div. 2
OTS price $1.60

Geophysics Corp. of America, Bedford, Mass.
CALCULATION OF THE SPATIAL DIFFUSION OF SMALL PARTICLES IN AN EXPONENTIAL ATMOSPHERE,
by Milton M. Klein, Kwang Yu and Richard H. Harrison. June 63, 20p. Technical rept. no. 63 5G
Contract DA49 46XZ075, ARPA Order 188 61
DASA 1400 Unclassified report

Descriptors: (*Atmosphere, Diffusion), Particles, Atmosphere models, Density, One-dimensional flow, Three-dimensional flow.

AD-434 038 Div. 2, 8
OTS price $3.60

California Inst. of Tech., Pasadena.
OBSERVATIONS OF THE OWENS VALLEY RADIO OBSERVATORY. THE SPECTRA OF NON-THERMAL RADIO SOURCES,
by Kenneth I. Kellermann. 1964, 33p.
Contract
Unclassified report

Descriptors: (*Extraterrestrial radio waves, Detection), Line spectrum, Distribution, Density, Magnetic fields, Tables, Radio astronomy.

The spectra of most non-thermal sources can be closely represented by a simple power law at least between 40 and 1400 Mc/s. The distribution of spectral indices for the sources away from the galactic plane is sharply peaked about a median value of -0.76, while the sources near the plane have a considerably wider dispersion of indices. The small-diameter, relatively weak sources tend to have relatively flat spectra. The most luminous sources, with high surface brightnesses, have normal spectra at decimeter wavelengths but are considerably flatter at meter wavelengths, suggesting that they are younger sources where equilibrium between the rate of injection of relativistic electrons and the rate of radiation loss has not yet been established. (Author)

AD-434 040 Div. 2
OTS price $1.10

California Inst. of Tech. Pasadena.
OBSERVATIONS OF THE OWENS VALLEY RADIO OBSERVATORY. 2. DIRECTION OF THE GALACTIC MAGNETIC FIELD IN THE VICINITY OF THE SUN,
by D. Morris and G. L. Berge. 1964, 7p.
Contract Nonr22019
Unclassified report

Descriptors: (*Magnetic fields, Galaxies), (*Sun, Magnetic fields), Direction finding, Configuration, Radio waves, Polarization, Rotation, Extraterrestrial radio waves.

AD-434 072 Div. 2
OTS price $6.60

Travelers Research Center Inc., Hartford, Conn.
COMBINATION OF INITIAL AND PROGNOSTIC DATA IN STATISTICAL CLOUD PREDICTION.
Technical documentary report no ESD-TDR-64-62,
by Duane S. Cooley, Frederick P. Ostby, Donald A. Chisholm and Abraham M. Pavlowitz. Mar 64, 61p.
Contract AF19 628 3357
ESD TDR64 62 Unclassified report

Descriptors: (*Clouds, Weather forecasting), Cloud cover, Statistical analysis, Atmospheric temperature, Polar regions, Data.

A study was made of the statistical prediction of low- and total-cloud amounts from parameters derived from numerical weather prediction (NWP), Air Weather Service moisture and temperature analyses and predictions, and other meteorological variables. Cloud data and other atmospheric data over Eurasia and the Arctic were analyzed on a grid mesh of approximately 208 mi (the NWP grid). Predictability of cloud amount was evaluated by using screening regression and multiple-discriminant analysis and testing the predicitions on independent data. Predictors considered included cloud amount, 1000-, 850-, and 500-mb height, geostrophic-wind components, surface and upper-level temperatures, stability, vorticity, divergence, upslope motion, thickness of isobaric layers, condensation-pressure spread, and vertical velocity. Some parameters were used in previous tests of statistical diagnosis of clouds. Values taken from predicted fields of the parameters are used to specify clouds at the predict- and time. Parameters are considered at initial time for prediction at lag. (Author)

AD-434 153 Div. 2
OTS price $3.60

Harvard Coll., Cambridge Mass. Observatory.
CLASSIFICATION OF SOLAR PROMINENCES FOR SUNSPOT CYCLE NO. 19 - 1960,
by Donald H. Menzel and F. Shirley Jones.
Feb 64, 32p. Scientific rept. 26
Contract AF19 604 4962, Proj. 7649, Task 764901
AFCRL 64 93 Unclassified report

Descriptors: (*Sunspots, Classification), Data, Tables, Intensity, Solar disturbances.

This report contains a tabulation and analysis of the behavior classification of prominences observed during 1960 at the Sacramento Peak Observatory, Sunspot, New Mexico. (Author)

AD-434 154 Div. 2
OTS price $2.60

Harvard Coll., Cambridge Mass. Observatory.
CLASSIFICATION OF SOLAR PROMINENCES FOR SUNSPOT CYCLE NO. 19 - 1961,
by Donald H. Menzel and F. Shirley Jones.
Feb 64, 28p. Scientific rept. 28
Contract AF19 604 4962, Proj. 7649, Task 764901
AFCRL 64 119 Unclassified report

Descriptors: (*Solar disturbances, Classification), (*Sunspots, Analysis), Astronomical observatories.

A tabulation and analysis is presented of the behavior classification of prominences observed during 1961 at the Sacramento Peak Observatory, Sunspot, New Mexico. (Author)

AD-434 176 Div. 2
OTS price $3.60

Minnesota Univ., Minneapolis, School of Physics.
THE MODULATION OF HEAVY NUCLEI IN THE PRIMARY COSMIC RADIATION,
by P. S. Freier and C. J. Waddington. Feb 64, 32p. TR CR70
Contract Nonr710 19
Unclassified report

Report on Cosmic Ray Project.

Descriptors: (*Cosmic rays, Intensity), Meteorological ballons, Ionization chambers, Geiger counters, Photographic emulsions, Modulation, Alpha particles, Data.

The intensities of the primary cosmic ray heavy nuclei, Z equal to or greater than 3, have been studied during several Forbush decreases. Fifteen values of the intensity were measured using nuclear emulsion detectors flown during a balloon cosmic ray monitoring program. These values are those observed before, during or after four of the largest Forbush decreases that occurred in the last solar cycle. Examination of this data, together with that previously available in the literature suggests that the heavy nuclei are modulated in a similar manner to the alpha-particle and protons of the primary radiation, showing that the modulation process is not a strongly charge dependent one. (Author)

Division 2 - ASTRONOMY, GEOPHYSICS AND GEOGRAPHY

AD-434 191 Div. 2, 25
OTS price $2.60

General Atomic Div., General Dynamics Corp., San Diego, Calif.
NEGATIVE IONS IN AFTERGLOWS IN ATMOSPHERIC GASES,
by Wade L. Fite and J. A. Rutherford. 31 Dec 63, 29p. Rept. no. 4867
Contract DA49 146XZ041, GA Proj. 79
DASA 1461 Unclassified report

Descriptors: (*Atmosphere, Gas discharges), (*Mass spectrum, Atmosphere), Ions, Mass spectroscopy, Nitrogen, Oxygen, Hydrogen, Sky brightness, Linear accelerators, Instrumentation, Gas ionization.

Mass spectrometric monitoring of ions in afterglows in atmospheric gases has been applied to the study of negative ions. Nitrogen-oxygen-hydrogen mixtures as well as the ''pure'' gases and ordinary air have been examined in a bakeable afterglow mass spectrometer. Of particular interest is the finding that for pressures of the order of 1 torr and after times of the order of milliseconds, minute impurities produce negative ion spectra which bear little resemblance to those which could be expected. Especially significant are the ions CO3-(mass 60) and NO3H2-(mass 64). It seems likely that many of the atmospheric phenomena usually attributed to O2- and NO2- in fact involve these and other heavier ions. (Author)

AD-434 205 Div. 2, 30
OTS price $1.60

Aerospace Information Div., Washington, D. C.
PHENOMENA IN THE UPPER ATMOSPHERE. REVIEW OF SOVIET LITERATURE.
26 Mar 64, 18p.
AID P64 16 Unclassified report

Trans. from Russian Text.

Descriptors: (*Upper atmosphere, Abstracts), Astrophysics, Documentation, Solar radiation, Van Allen radiation belts, Meteorology, Meteorological satellites, Lightning, Atmosphere, Shock waves, Plasma medium, Cosmic rays, Terrestrial magnetism, Photoelectric effect, Atmospheric electricity, Reviews.

AD-434 346 Div. 2
OTS price $2.60

MacDonald Physics Lab. McGill U. (Canada).
THE ELECTRICAL PROPERTIES OF SALINE ICE.
Final rept.,
by J. R. Addison and E. R. Pounder. 30 Jan 64, 25p.
Contract AF19 604 8378, Proj. 8623, Task 862301
AFCRL 64 52 Unclassified report

Descriptors: (*Ice, Sea water), Electrical properties, Electrodes, Salinity, Acrylic resins, Test methods, Audiofrequency, Radiofrequency, Electrical conductance, Dielectric properties.

A review is given of the literature on the electrical properties of saline ice. Resules are given for a number of samples of varying salinity over the frequency range from 20 cycles per second to 100 Mc. All measurements were made at -22 C. Extraordinarily large capacitances are found at audio frequencies. If these are considered to result from the bulk dielectric coefficient of the ice, one obtains dielectric coefficients ranging from about 10 to the 6th power at 20 c.p.s. down to less than 10 at 100 Mc. The coefficient varies approximately as the reciprocal of the frequency in the audio range, and decreases more slowly with higher frequencies in the R.F. range. A possible explanation is that ions in the brine pockets migrate under the applied field forming macroscopic dipoles and thus yielding a high bulk polarization. (Author)

AD-434 379 Div. 2, 8
OTS price $2.60

Air Force Cambridge Research Labs., Bedford, Mass.
ACCURACY OF METEOROLOGICAL DATA OBTAINED BY TRACKING THE ROBIN WITH MPS-19 RADAR,
by Robert W. Lenhard Jr. and Margaret P. Doody. Dec 63, 22p.
Proj. 6670
AFCRL 63 938; IGA35 Unclassified report

Descriptors: (*Meteorological balloons, Radar tracking), (*Radar equipment, Errors), Wind, Meteorological parameters, Sounding rockets, Radar transmitters, Radar receivers, Flight paths.

A sample of 32 ARCAS-ROBIN rocket soundings that were tracked simultaneously by FPS-16 and MPS-19 radars was examined to determine the accuracy of meteorological data obtained from the less accurate radar, the MPS-19. The root-mean-square error in winds determined by the MPS-19 increased with altitude in a reciprocal relationship from 5 mps at 30 km to 45 mps at 70 km; it was less than 10 mps at all levels below 55 km. No evaluation of the accuracy of thermodynamic data was possible. Any such data obtained from an MPS-19 track will be rejected under the criteria of the existing data reduction program as being from a target that failed to inflate. (Author)

AD-434 384 Div. 2
OTS price $2.60

Army Electronics Research and Development Activity, White Sands Missile Range, N. Mex.
CHARACTERISTICS OF ACOUSTIC ATMOSPHERES,
by L. Edwin Williamson. Mar 64, 21p.
Task 1G6 20901A040 06
AERDA 127 Unclassified report

Descriptors: (*Acoustics, Atmosphere), Meteorological satellites, Sounding rockets, Periodic variations, Temperature, Wind.

Data from approximately three hundred meteorological rocket soundings are analyzed to study the seasonal and geographical variations in the general atmospheric acoustic structure. Geographical categories are defined as subtropical, midlatitude and subpolar, and meridional variations within these categories are briefly discussed. The winter and summer periods are determined by the direction of flow in the upper stratosphere, between the spring and fall reversal periods. Tentative results show that the mean acoustic structure exhibits significant temporal and spatial variations. For certain features in the mean acoustic profile, sound speed variations in excess of 25 m/sec may exist in a seasonal transition. Similar differences may exist between the profiles representing subtropical and subpolar locations during a season. Height differences of these features may exceed a 3 km for either a seasonal or low-to-high latitude transition. (Author)

AD-434 412 Div. 2, 12
OTS price $2.60

Westinghouse Defense and Space Center, Baltimore, Md.
CELESTIAL MECHANICS RESEARCH.

Final rept.,
by G. Shapiro and E. W. Paul. 28 Jan 64, 30p.
Contract AF49 638 1002
AFOSR 64 0132 Unclassified report

Descriptors: (*Celestial mechanics, Perturbation theory), Stability, Elliptical orbit trajectories, Time, Satellites (Artificial), Integration, Bessel function.

Research under this contract in the field of celestial mechanics is summarized as well as some sums of series involving Bessel functions. (Author)

AD-434 501 Div. 2
OTS price $2.60

RAND Corp., Santa Monica, Calif.
A WATER-CLOUD INTERPRETATION OF VENUS' MICROWAVE CONTINUUM,
by D. Deirmendjian. Apr 64, 31p. Memo. no. RM4060PR
Contract AF49 638 700
Unclassified report

Descriptors: (*Venus, Water vapor), (*Atmosphere models, Venus), Microwaves, Millimeter waves, Clouds, Atmospheric condensation, Band spectrum, Scattering, Absorption, Water, Barometric pressure, Atmospheric temperature, Attenuation, Extraterrestrial radio waves, Emissivity, Atmospheric refraction, Planetary atmospheres, Microwaves.

The most recent microwave brightness determinations of Venus are analyzed in the light of new theoretical results concerning the equivalent scattering and absorption properties of typical terrestrial clouds and precipitation. Based on the argument that the analysis of existing data does not conclusively demonstrate the absence of large amounts of water in the lower Venusian atmosphere, it is shown that a 600K surface temperature and a planet-wide continuous and thick water-cloud veil is consistent with the observed microwave brightness distribution in the millimeter and centimeter range. The total water content of this veil is estimated at 10 gm per sq cm. The surface pressure of the sustaining atmosphere may be as low as three atmospheres. (Author)

AD-433 503 Div. 2
OTS price $2.60

Stanford Research Inst., Menlo Park, Calif.
THE SYNOPTIC CLIMATOLOGY OF CLOUD-FREE AREAS.
Final rept.,
by Sidney M. Serebreny and John E. Alder. Jan 64, 22p.
Contract AF19 628 2363 SRI Proj. 4330
AFCRL 64 230 Unclassified report

Descriptors: (*Climatology, Air mass analysis), (*Air mass analysis, Climatology), High altitude, Anticyclones, Meteorological satellites, Analysis, Orbital trajectories, Pressure, Models (Simulations), Air, Clouds, Distribution.

This report discusses the results of an investigation of the synoptic patterns and air mass characteristics associated with large areas of 500,000 square nautical miles or more over high-latitude continental regions of the northern hemisphere which were coded as clear in the published nephanalyses of TIROS I through TIROS V. Such clear areas were catalogued according to synoptic type and region, and their persistence, extent, and displacement, if any, were also investigated. The implications of the results of this investigation are discussed and recommendations are made for future study. (Author)

AD-433 504 Div. 2
OTS price $8.60

Stanford Research Inst., Menlo Park, Calif.
THE SYNOPTIC CLIMATOLOGY OF CLOUD-FREE AREAS,
by John E. Alder and Sidney M. Serebreny.
Jan 64, 92p. Rept. no. SR 1
Contract AF19 628 2363, SRI Proj. 4330
AFCRL 64 229 Unclassified report

Descriptors: (*Air mass analysis, Anticyclones), Meteorological satellites, Aerial photographs, Clouds, Cloud cover, Weather forecasting.

This report discusses the results of an investigation of the synoptic patterns and air mass characteristics associated with large areas of 500,000 square nautical miles or more over high-latitude continental regions of the northern hemisphere which were coded as clear on nephanalyses of Tiros pictures. The published nephanalyses of Tiros I through Tiros V were examined to locate such clear areas, which were then catalogued according to synoptic type and region. Persistence, extent, and displacement, if any, of these clear areas were also investigated. (Author)

AD-434 540 Div. 2
OTS price $9.10

San Andres Univ., La Paz (Bolivia).
TIME VARIATIONS IN COSMIC RAYS AND RADIOSONDE MEASUREMENTS.
Final technical rept.,
by Ismael Escobar. June 63, 105p. Rept. no. 25
Grant AF AFOSR62 395
Unclassified report

Descriptors: (*Cosmic rays, Measurements), (*Radiosondes, Measurements), Time, Electromagnetic waves, Experimental data, Cosmic ray telescopes, Intensity, Solar wind, Velocity, Blast, Configuration, Polarization, Comets, Luminescence.

This report covers the experimental work performed on cosmic ray and radiosonde measurements. In the different sections of this report information based mainly or completely on data result from local experiments is given. In the first two parts, papers dealing with cosmic ray studies are presented, one concerning the electromagnetic states of the interpanetary space and the other concerning Forbush decreases. In the third part of the report, the results of the measurements obtained with the radiosonde equipment installed at Ovejuyo, are given. (Author)

AD-434 566 Div. 2
OTS price $3.60

Deutscher Wetterdienst, Frankfurt (Germany).
ON THE BEHAVIOUR OF DISTURBANCES IN A BAROCLINIC CHANNEL,
by W. Edelmann. 30 Apr 63, 36p. TN 7
Contract AF61 052 373
AFCRL 64 109 Unclassified report

Original contains color plates: All DDC reproductions will be in black and white. Original may be seen in DDC Headquarters.

Descriptors: (*Air mass analysis, Atmosphere models), Barometric pressure, Difference equations, Atmospheric temperature, Cyclones, Anticyclones, Friction.

With the use of a 5-level model starting with a long wave barotropic initial disturbance, two

forecasts over 12 days were computed, including and excluding skin friction. Within a period of a few days warm front, cold front, occlusion, warm front waves, cold front waves, new cyclones and anticyclones of different types are developing. Later on examples of frontolysis, cyclolysis and the disappearing of anticyclones are observed. Without skin friction the results do not look realistic, however, including skin friction the results simulate very closely a real weather development. (Author)

AD-434 673 Div. 2, 30, 31
OTS price $8.65

Woods Hole Oceanographic Institution, Mass.
AUTOMATIC GRAVITY SYSTEM USED ABOARD R/V CHAIN JULY 1962 - SEPTEMBER 1963. SUPPLEMENTARY REPORT,
by Carl O. Bowin. Oct 63, 96p. Reference no. 63 40
Contract Nonr4029 00
Unclassified report

Descriptors: (*Oceanographic data, Gravity), (*Digital computers, Real time), Design, Input-output devices, Programming (Computers), Data processing systems, Digital-to-analog converters, Depth finding, Measurement, Navigation, Gyrocompasses.

An automatic sea gravity system utilizing a digital computer was designed and developed in an effort to reduce the time required to bring together the pertinent information for the computation of gravity values, to reduce the time required for the computations themselves, and to make results available for interpretation, planning, and checking purposes aboard ship while the cruise is in progress. The system consists of: a LaCoste and Romberg Sea Gravity Meter, data conversion units for computer compatibility with the gravity meter, ship's gyrocompass and ship's speed log, an IBM 1710 mod 1 Control System (the combination of a 1620 Computer and a 1711 Data Converter for analog to digital conversion), and typewriter and paper tape input-output units. (Author)

AD-434 705 Div. 2
OTS price $5.60

Acoustics and Seismics Lab. U. of Michigan, Ann Arbor.
ACOUSTIC DETECTION OF HIGH - ALTITUDE TURBULENCE,
by John W. Wescott. 11 Mar 64, 55p. Rept. no. 3746 38 T
Contract DA20 0180RD22840
Unclassified report

Descriptors: (*Turbulence, High-altitude), (*Detection, Acoustics), (*Acoustics, Detection), (*Acoustic detectors, Scientific research), Noise, Extremely low frequency, Balloon equipment, Spectroscopy, Correlation techniques, Probability, Density, Experimental data.

Background noise at frequencies from 0.2 to 200 cps was monitored with free-floating, balloon-borne acoustic probes at altitudes of 55,000 to 73,000 feet. Spectrograms, signatures, cross-correlations, and probability-density curves were obtained from the data. The noise has a spectrum with 6 db/octave negative slope, is acoustic and Gaussian, and is time-steady for periods of severral hours, although noise pressures from 0.03 to 1 dyne/sq. cm were measured on different days. These and other results indicate that the noise comes from lower altitudes and is produced by an array of statistically independent radiators, such as turbulent eddies. A theory for the power spectrum of noise radiated by turbulence is cited, and the predicted spectrum is compared to the experimental results. Other possible sources of high-altitude acoustic noise are described. Descriptions and illustrations of the instruments used to acquire and process the experimental data are presented. (Author)

AD-434 776 Div. 2
OTS price $1.60

Innsbruck U. (Austria).
PROPAGATION OF VLF WAVES IN HIGHLY CONDUCTING MEDIUM,
by O. Grobner. 1 Dec 63, 16p. Technical note no. 7
Contract AF61 052 490
AFCRL 64 145 Unclassified report

Descriptors: (*Very low frequency, Electromagnetic waves), (*Electromagnetic waves, Very low frequency), (*Propagation, Very low frequency), (*Rock (Geology), Propagation), Underground structures, Mining engineering, Measurement, Theory, Magnetic fields.

For studying the propagation of VLF waves in rock, an excursion to German and Dutch mines was made in September 1963. It was the purpose of this excursion to conduct measurements of subsurface propagation through geological bodies which in their structure and in the type of disturbances (mineralization) differed considerably from the regions of Tyrolian mines studied so far. (Author)

AD-434 778 Div. 2
OTS price $6.60

Kiruna Geophysical Observatory (Sweden).
MAGNETOMETER, PHOTOMETER, AND EARTH OBSERVATIONS AT KIRUNA.
Final rept.,
by Georg Gustafsson and Alv Egeland. 15 Feb 64, 70p.
Contract AF61 052 688
AFCRL 64 245 Unclassified report

Descriptors: (*Terrestrial magnetism, Tables), (*Magnetometers, Data), (*Electric fields, Earth), Aurorae, Photometers, Astronomical observatories, Upper atmosphere, Magnetic fields.

The magnetic data have been represented by the K-indices, which give the range of the magnetic variation during three hour periods. The auroral activity has been measured by a photometer scanning along the geographic meridian. The intensity of the green auroral line has been measured, and an auroral index related to the intensity of the 5577 Angstrom units line has been included in the report. An equipment for the measurement of the earth current potentials has been installed at the observatory. The potential variations of the east-west, and north-south components have been measured. It has been found that the north-south component is 3.5 times stronger than the east-west component. The data of the earth current variations (north-south component) have been represented by the range of variation in mV/km over three hour intervals. (Author)

AD-434 779 Div. 2, 6
OTS price $2.60

Imperial Coll. of Science and Tech., London (Gt. Brit.).
THE DISTORTION CUMULONIMBUS PRECIPITATION OBSERVED BY RADAR,

by J. R. Probert-Jones. Nov 63, 24p. Technical scientific note no. 13
Contract AF61 052 254, Proj. 8620, Task 86204
AFCRL 64 249 Unclassified report

Descriptors: (*Atmospheric precipitation, Radar echo areas), (*Radar pulses, Distortion), Clouds, Meteorological radar, Cumulonimbus clouds, Storms, Intensity, Attenuation, Nomographs, Cathode ray tubes, Display systems.

The intensity of the returned signal at any point on a radar display is due to the back-scattering from all the elements within the volume of the pulse. The depth of the pulse in range is only small, but its width both in azimuth and elevation is proportional to range, and significant power can be received from well outside the half-power points. This integration over the pulse volume produces a distortion of the intensity pattern, whose effect increases with range. In particular, strong gradients of intensity such as occur at the edges of cumulonimbus precipitation will be smoothed out, so that echo will be displayed outside the true edge of the precipitation. (Author)

AD-434 938 Div. 2
OTS price $1.10

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
PECULIARITIES OF OPTICAL CHARACTERISTICS OF ARCTIC MASSES OF AIR,
by N. I. Nikitinskaya. 12 Jul 63, 9p.
FTD MT63 17 Unclassified report

Trans. from Trudy, Issledovaniya Radiatsionnykh Protsessov, No. 118, pp. 77-31, 1961, Leningrad.

Descriptors: (*Air mass analysis, Polar regions), Optical properties, Surfaces, Air, Motion, Diurnal variations, Atmosphere, Thickness, Aerosols.

Work is devoted to research of spectrophotometric characteristics of Arctic masses of air under the conditions of the Leningrad region. Shown characteristics distinguish pure Arctic air from air masses of other origin. (Author)

AD-434 941 Div. 2
OTS price $1.60

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
CONCERNING DEPENDENCE OF AMPLITUDE OF SEISMIC OSCILLATIONS ON WEIGHT OF CHARGE,
by I. I. Gurvich and Chzhao Bin. 12 July 63, 12p.
FTD MT63 36 Unclassified report

Trans. from Prikladnaya Geofizika, No. 30, pp. 12-18, 1961.

Descriptors: (*Geophysical prospecting, Seismic waves), (*Explosions, Clay), Measurement, Oscillation, Sensitivity, Propagation, Recording systems, Experimental data.

AD-434 949 Div. 2
OTS price $1.60

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
EXPERIMENTAL RESEARCHES OF SPECTRAL TRANSPARENCY OF ATMOSPHERE,
by Yu. I. Rabinovich and L. N. Guseva. 19 Aug 63, 13p.
FTD MT63 16 Unclassified report

Trans. from Trudy, Glavnaya Geofizicheskaya Observatoriya, 'Issledovaniya Radiatsionnykh Protsessov', no. 118, pp. 69-76, 1961.

Descriptors: (*Solar radiation, Atmosphere), (*Solar spectrum, Measurement), Instrumentation, Visibility, Interference, Potentiometers, Optics, Light transmission, Circuits, Optical filters.

Results are considered of the spectral measurements of direct solar radiation in visible region of the spectrum. Offered are the analytic relation between the spectral and the general coefficients of transparency. (Author)

AD-434 954 Div. 2
OTS price $2.60

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
MOVEMENT OF A GAS UNDER THE ACTION OF A CONCENTRATED IMPACT ON ITS SURFACE (DURING AN EXPLOSION ON THE SURFACE),
by Yu. P. Rayzer. 24 Sep 63, 24p.
FTD MT63 80 Unclassified report

Trans. from Zhurnal Prikladnoy Mekhaniki i Tekhnicheskoy Fiziki, No. 1, pp. 57-66, 1963.

Descriptors: (*Meteorites, Impact shock), Cratering, Shock waves, Attenuation, Gases.

AD-435 006 Div. 2
OTS price $1.00

Aeronautical Systems Div., Wright-Patterson Air Force Base, Ohio.
INSTRUMENTATION AND OPERATIONS FOR GATHERING THUNDERSTORM DATA WITH AN F-100F AIRCRAFT DURING THE 1963 NATIONAL SEVERE STORM PROJECT,
by E. B. Underwood. Feb 64, 35p.
Proj. 804A, Task 8620602
ASD TDR64 77 Unclassified report

Descriptors: (*Thunderstorms, Instrumentation), Meteorological phenomena, Operation, Aircraft equipment, Research planes, Measurement, Design, Pressure, Temperature, Water, Ice formation indicators, Gusts, Acceleration, Velocity, Electric fields.

Equipment to measure meteorological phenomena inside thunderstorms was designed, fabricated, installed, and operated in an F-100F jet fighter aircraft, and chaff was dropped into storms for study by ground radar from an RB-47 jet bomber aircraft, in conjunction with the National Severe Storm Project near Oklahoma City, Oklahoma. Devices which were used for the first time in this environment were those used to measure continuously differential static pressure and liquid water temperature, and to determine the presence of ice crystals and icing conditions. Other parameters recorded were normal acceleration, vertical gust velocity, free air temperature, liquid water content, electric field strength, hail mass, and static discharge current. The data collected during the ASD flight test program is archived with the U. S. Weather Bureau, and can be obtained through the National Severe Storm Project. (Author)

AD-435 051 Div. 2
OTS price $1.60

Geophysics Corp. of America, Bedford, Mass.
CALCULATION OF THE SPATIAL DIFFUSION OF SMALL

PARTICLES IN AN EXPONENTIAL ATMOSPHERE,
by Milton M. Klein, Kwang Yu and Richard H. Harrison. June 63, 20p. Rept. no. TR63 5 G
Contract DA49 146XZ075, Proj. 7200, ARPA Order 188 61
DASA 1400 Unclassified report

Descriptors: (*Particles, Atmosphere), (*Diffusion, Particles), Atmospheric motion, Motion, Density, Mathematical analysis, Integral equations.

AD-435 053 Div. 2
OTS price $6.60

Research and Advanced Development Div., Avco Corp., Wilmington, Mass.
TRANSPORT PROPERTIES OF NITROGEN, HYDROGEN, OXYGEN, AND AIR TO 30,000 K,
by Jerrold M. Yos. 22 Mar 63, 70p. Rept. no. TM63 7
Contract AF33 616 7578, Task 73603
Unclassified report

Descriptors: (*Hydrogen, Transport properties), (*Nitrogen, Transport properties), (*Oxygen, Transport properties), (*Air, Transport properties), Viscosity, Thermal conductivity, High-temperature research, Diffusion, Barometric pressure, Atmospheric temperatures.

The viscosity, thermal conductivity, electrical conductivity, binary diffusion coefficients, and total radiated power in the continuum have been calculated for hydrogen, nitrogen, oxygen, and air for temperatures from 1000 to 30,000 K and for pressures from 1 to 30 atm. The viscosity, electrical and thermal conductivites, and diffusion coefficients were calculated from the first Chapman-Enskog approximation, using the best available cross-section data from the literature. Coulomb collisions were treated approximately by means of effective collision cross sections, chosen to make the calculated transport properties agree with the results of Spitzer and Harm3 for the fully ionized case. Effects of ambipolar diffusion and charge exchange were included in the calculation. The continuum radiated power was calculated from Kramers' semiclassical approximation with an empirical correction factor to make the results agree with the limited experimental data available in the range of interest. The calculated transport properties agree well with the results of Mason, et al, at low temperatures and of Spitzer and Harm3 at high temperatures, but in the intermediate temperature range, from about 10,000 to 20,000 K, the results differ rather significantly from the results obtained by previous investigators. (Author)

AD-435 056 Div. 2
OTS price $2.60

Coast Guard, Washington, D. C.
OCEANOGRAPHIC MANUSCRIPT ON THE RELIABILITY OF FIELD MEASUREMENTS OF SALINITY WITH THE INDUCTIVE SALINOMETER,
by Richard M. Morse. 1 Oct 63, 23p.
Unclassified report

Descriptors: (*Salinity, Measurement), (*Salinometers, Oceanographic equipment), Statistical analysis, Sampling, Tables, Reliability, Oceanographic data.

During the late winter and early spring of 1963 personnel of the U. S. Coast Guard Oceanographic Unit and of the U. S. Naval Oceanographic Office shared two cruises aboard a Coast Guard Ocean Station Vessel in the North Atlantic Ocean. Of 140 serial stations occupied, 45 were taken and processed to completion by Coast Guard personnel. Station planning was cooperative, and all data obtained from the ''Coast Guard stations'' was provided to the NAVOCEANO party. Salinities were determined by the Coast Guard using a shipboard inductive salinometer, and by NAVOCEANO from bottled samples returned to their shore laboratory. Both sets of reduced data were monitored by the National Oceanographic Data Center and from final processing over 600 salinity comparisons were available. The comparisons were subjected to statistical analysis yielding frequency distribution of differences, standard deviation and several probability limits. (Author)

3. CHEMICAL WARFARE EQUIPMENT AND MATERIALS

AD-433 712 Div. 3
OTS price $1.60

Midwest Research Inst., Kansas City, Mo.
INVESTIGATION OF THE FLASHING OF AEROSOLS.
Quarterly progress rept. no. 3, 18 Sep-17 Dec 63,
by Alan R. Pittaway. 4 Mar 64, 13p.
Contract DA18 108AMC118A, MRI Proj. 2685C
Unclassified report

Descriptors: (*Aerosols, Flammability), (*Flammability, Aerosols), Explosive gases, Chemical warfare agents, Explosions, Combustion, Ignition, Particle size, Shock waves.

This program is concerned with determining flammability of aerosol systems. The liquid phase material has been purified and a method of obtaining the small range of particle sizes evaluated. The explosive detonation product gas mixture has been determined to be flammable over the range of 25 to 52.5 per cent by volume. It was found that very large concentrations of QL aerosol in this gas-mixture do not significantly change the flammability limits. (Author)

AD-433 872 Div. 3, 6, 12
OTS price $1.10

Hughes Aircraft Co., Fullerton, Calif.
COLLECTIVE PROTECTION EQUIPMENT FOR THE AN/MSG-4 SYSTEM PHASES II AND III DEVELOPMENT, FABRICATION, AND TEST.
Bi-monthly technical progress rept. no. 12, 1 Jan-29 Feb 64,
by L. W. Maples. 26 Mar 64, 4p. Rept. no. FR64 11 56
Contracts DA18 108cm16618 and DA18 108AMC28A
Unclassified report

Descriptors: (*Radar tracking, Feasibility studies), Performance tests, Design, Maintenance, Tests, Guided missiles, Vehicles, Shelters, Modification kits.

AD-434 105 Div. 3
OTS price $5.60

Aerojet General Corp., Downey, Calif.
EFFECT OF RADIAL DISTANCE FROM HIGH EXPLOSIVE ON BREAKUP CHARACTERISTICS OF SOLID MATERIALS IN SPHERICAL BOMBLETS,
by P. A. O'Donovan. 18 Feb 64, 57p. Special rept. no. 0395 04 16SP
Contract DA18 108 405cm1829
Unclassified report

Descriptors: (*Chemical warfare agents, Diffusion), (*Chemical bombs, Aerosols), (*Diffusion, Aerosols), Aerosol generators, Aerosols, Spheres, Explosive materials, Explosion effects, Tracer studies, Quinones, Polycyclic compounds, Aromatic compounds, Amino acide, Particles, Particle size, Samplers, Complex compounds, Sulfates, Hydrates, Potassium compounds, Chromium compounds, Cellulose acetate, Decomposition, Absorption spectrum, Chromatographic analysis, Aluminum, Copper.

This special report describes an experimental method for determining the effect of radial distance from an explosive charge on the net size reduction of solid particles in a spherical CW bomblet. Data showing the effect of position in bomblet, size of bomblet, agent-to-explosive mass ratio and shock amplification on final breakup are presented. Methods for chemical analysis of both the inorganic and organic materials used as agents (simulants) and tracers are presented. (Author)

AD-434 169 Div. 3
OTS price $5.60

Metronics Associates, Inc., Palo Alto, Calif.
THE FLUORESCENT PARTICLE ATMOSPHERIC TRACER,
by Philip A. Leighton. 28 Feb 64, 53p.
Technical rept. no. 104
Contract DA42 007AMC21R
Unclassified report

Descriptors: (*Diffusion, Aerosols), (*Particles, Diffusion), (*Fluorescence, Aerosols), (*Aerosols, Diffusion), Meteorology, Tracer studies, Zinc compounds, Cadmium compounds, Sulfides, Particle size, Pigments, Complex compounds, Aerosol generators, Samplers, Ultraviolet radiation, Excitation, Errors.

This paper discusses the current status and validity of the fluorescent particle tracer technique. Material properties, the blower generator, membrane filter, drum impactor, and Rotorod samplers, and counting techniques, are described. Inherent and operational errors involved are evaluated. Evidence on the atmospheric diffusion, fallout and impaction, and fluorescent stability of the particles is presented. It is concluded that in the present state of development of the technique, the errors, in terms of 90% confidence intervals, are approximately ± 5-10% for source strength determination, ± 10-12% (if 300 particles are counted) for dosages determined by the Rotorod, and ± 17-20% for dosages determined by the membrane filter sampler. (Author)

AD-434 327 Div. 3
OTS price $1.10

Ethyl Corp., Ferndale, Mich.
INVESTIGATION OF ALKYL ALUMINUM COMPOUNDS.
Quarterly progress rept. no. 1, 13 Dec 63-12 Mar 64,
by Martin E. Gluckstein. 1 Apr 64, 9p.
Rept. no. GR 64 18
Contract DA18 035AMC109A, Proj. 90621
Unclassified report

Descriptors: (*Pyrophoric materials, Incendiary gels), (*Aluminum compounds, Incendiary gels), (*Incendiary gels, Flamethrower fuels), (*Flamethrower fuels, Incendiary gels), Metalorganic compounds, Storage, Stability, Production, Materials, Management engineering, Flamethrowers, Fuel thickeners, Fuel additives, Test methods.

Program planning, however, proceeded to a point where the major program efforts were defined, evaluated and concurrence of the project technical officer obtained. It is expected that the next reporting period will carry us well into the experimental storage stability determination and other aspects of this program, including process development and new formulation investigations. (Author)

AD-434 664 Div. 3
OTS price $2.60

Feltman Research Labs., Picatinny Arsenal, Dover, N.J.
EVALUATION OF NONGASEOUS HIGH ALTITUDE FLARE COMPOSITIONS,
by Joseph Kristal and Seymour M. Kaye. Feb 64, 22p.
Proj. 504 01 027
FRL TM1270 Unclassified report

Descriptors: (*Flares, Pyrotechnics), (*Pyrotechnics, Flows), Simulation, High altitude, Luminescence, Buring rate, Zirconium, Calcium compounds, Borides, Magnesium, Oxides, Manganses compounds, Molybdenum compounds, Chromium compounds, Barium compounds, Strontium compounds, Iron compounds, Peroxides, Chromates, Thermochemistry.

A survey was conducted of essentially nongaseous flare systems at sea level and reduced pressure conditions equivalent to altitudes ranging up to 100,000 feet. The luminosity of nongaseous systems was found to undergo less reduction and their pressure coefficient of burning rate showed less change on transition from sea level to reduced pressure conditions that those developed by gaseous flare systems. It was found that nongaseous systems, when tested at reduced pressure, gave candlepower and burning time values that approximate or exceed those of standard magnesium-sodium nitrate compositions under the same reduced pressure conditions. No nongaseous system studied produced greater candlepower or luminous effieiency at reduced pressures than the metallic calcium gaseous systems found optimum for low pressure use. The materials investigated were Zr, CaB6, B, and mg as fuels and MnO2 B2O3, MoO3, Cr2O3, WO3, Bi2O3, BaCrO4, BaO2, SrO2, Fe2O3 as oxidants. (Author)

4. CHEMISTRY

AD-433 578 Div. 4
OTS price $1.60

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
SYNTHESIS OF POLYMERIC POLYDIOXYARYLENEPHOSPHONITRYLATES,
by S. M. Zhivukhin, V. B. Tolstoquzov and V. V. Kireyev. 17 Feb 64, 13p.
FTD TT63 1101 Unclassified report

Trans. from Plasticheskiye Massy, no. 7, pp. 24-28, 1963.

Descriptors: (*Heat-resistant plastics, Synthesis (Chemistry)), (*Phenolic plastics, Synthesis (Chemistry)), (*Phosphonitrile chlorides, Heat-resistant plastics), Esters, Ethers, Resorcinol, Phenols, Epoxy plastics, Varnishes, Flammability, Polyamide plastics, Molecular structure.

Polydioxyarylenephosphonitrylates can be synthesized in various ways: by condensation of phosphonitrylchlorides with diatomic phenols or with their phenolates, or by exchange of esters between alkoxyphosphonitrylates or alkoxyphosphonitrylchlorides and diatomic phenols. The conditions under which these processes occur and the effect of various factors on the formation and structure of the polymers obtained are discussed. The structure and properties of these polymers and methods of modifying them were investigated. Their thermal stability and fire resistant properties are discussed. (Author)

AD-433 643 Div. 4
OTS price $1.10

Gibbs Chemical Lab., Harvard U., Cambridge, Mass.
A SYNTHESIS OF $C_3H_3^+$(HYPOTHETICAL),
by G. P. Glass and G. B. Kistiakowsky. Mar 64, 6p.
Contract Nonr1866 36
Unclassified report

Descriptors: (*Halogenated hydrocarbons, Iodine compounds), (*Cycloalkanes, Synthesis (Chemistry), (*Free radicals, Cycloalkanes), Ions, Mixtures, High-temperature research, Ionization, Heat of activation, Heat of reaction, Heat of formation, Electrical conductance, Alkynes, Shock waves, Pyrolysis.

AD-433 664 Div. 4
OTS price $.50

Feltman Research Labs., Picatinny Arsenal, Dover, N. J.
SYNTHESIS OF POLYAMIDES CONTAINING S-TRIAZINE RINGS,
by E. A. Hoess and E. L. O'Brien. Feb 64, 17p.
Proj. 1A0 24401A110
PA TM1253 Unclassified report

Descriptors: (*Polyamide plastics, Synthesis (Chemistry)), (*Triazines, Polyamide plastics), (*Phthalates, Polyamide plastics), Amines, Polycyclic compounds, Phthalic acids, Condensation reactions, Reduction (Chemistry), Nitration, Polymerization, Adhesives, Heat resistant plastics, Stability, Spectra (Infrared), Pyrolysis.

The ultimate goal of this program is to synthesize new polymeric species which will serve as backbones for the preparation of thermally stable adhesives for service temperatures up to 538 C. To accomplish this objective, polyamides were synthesized in order to characterize their ability to meet temperature requirements. Synthesis of polyamides from aminobenzoguanamine and terephthalic acid with reactive functional groups appeared practicable, but poly-aminobenzoguanamine terephthalate did not appear to have the desired high temperature resistance. Synthesis of s-triazine polyamide derived resins with highly reactive groups attached will require chemical modification of the polymeric base compound. (Author)

AD-433 694 Div. 4
OTS price $3.60

Vienna Univ. (Austria).
POLAROGRAPHIC STUDIES IN CERTAIN NON-AQUEOUS SYSTEMS,
Final rept.
by Viktor Gutmann. 10 Feb 64, 36p.
Contract AF61 052 487
ARL 64 52 Unclassified report

Descriptors: (*Polarographic analysis, Organic solvents), (*Complex compounds, Polarographic analysis), Cadmium alloys, Zinc alloys, Water, Sulfoxides, Chromium compounds, Chlorine compounds, Chemical analysis, Phosphates, Benzene, O-heterocyclic compounds, Lithium, Sodium, Potassium, Barium, Zinc, Nickel, Perchloric acid, Sodium compounds, Sulfates, Bromides, Chlorides, Iron, Calcium, Aluminum, Magnesium, Strontium, Oxides, Nitrogen compounds, Beryllium, Esters.

A new method has been developed to determine trace-amounts of water and of organic substances containing active hydrogen, such as alcohols. Analytical procedures have been worked out for the determination of (a) Li in the presence of excess Na, K, and Ba,, (b) Zn in a Zn-Cd alloy, (c) Co in excess Ni, (d) $HClO_4$ in $NaHSO_4$, (e) the sum of NaBr and $NaBrO_4$ in NaCl, (f) Fe in alloys, (g) small amounts of Ca in Zn, (h) the sum of salts of Na , K, Li, Ma, Ca, Sr and Ba in H_2O, (i) traces of Mg and Ca in H_2O, (k) Al, (l) Be and (m) the nitrate ion. Gas polarography has been developed in dimethyl sulfoxide. Co-ordination phenomena have been followed in solutions of dimethyl sulfoxide by means of the polarographic method. (Author)

AD-433 796 Div. 4
OTS price $1.60

Naval Research Lab., Washington, D. C.
A STUDY OF AUTOPHOBIC LIQUIDS ON PLATINUM BY THE CONTACT POTENTIAL METHOD,
by C. O. Timmons and W. A. Zisman. 13 Feb 64, 12p.
NRL 6020 Unclassified report

Descriptors: (*Lubricants, Adsorption), (*Monomolecular films, Adsorption(*Adsorption, Monomolecular films), (*Platinum, Monomolecular films), Esters, Alcohols, Octanic acids, Aromatic compounds, Phosphites, Iodine compounds, Halogenated hydrocarbons, Chlorine compounds, Humidity, Electric potentials, Phosphates.

Several nonspreading liquids were investigated on a platinum surface using contact potential and contact angle measurements to determine whether or not their nonspreading behavior was caused by autophobicity, i.e., the property of a liquid being unable to spread upon its own adsorbed monolayer. The liquids studied were n-octanol, n-octanoic acid, tri-p-cresyl phosphite, mixed meta- and para-isomers of tricresyl phosphate, methylene iodide, and three chlorinated biphenyls. Each liquid was shown to be autophobic by the contact potential difference and contact angle data for adsorbed monolayers on platinum. Contact potential differences for the phosphate and phosphite were the same, indicating that the two types of moleculse have different mechanisms of surface interaction with the metal surface. It was also found that raising the relative humidity affects the autophobic contact angle of liquid n-octanol, and methylene iodide, but the effect is opposite in sign for the methylene iodide. This result sheds considerable light on the effect of water adsorption on the adsorptive properties of halogen derivatives of the hydrocarbons. (Author)

AD-434 046 Div. 4
OTS price $3.60

Naval Radiological Defense Lab., San Francisco, Calif.
RADICAL YIELDS IN IRRADIATED AROMATICS,

by J. I. McAndrews, T. H. Anderson and S. B. Martin. 31 Jan 64, 33p.
Proj. SR011 01 01, Task 0401
NRDL TR718 Unclassified report

Descriptors: (*Radiation chemistry, Aromatic compounds), (*Free radicals, Cryogenics), Alcohols, Benzene, Diphenyl, Electrons, Spin, Resonance, Cyclohexenes, Hydrocarbons.

The relatively high efficiency of production of free radicals which become stabilized at liquid nitrogen temperature during the radiolysis of several aromatic hydrocarbons demonstrates the quantitative importance of these intermediates in the mechanism of radiation decomposition. The required measurement of G(R.) values necessitated the indirect approach of comparing partially saturated ESR absorption spectra at high powers and then evaluating the extent of saturation in an independent measurement. g9r.0 values are: benzene, 0.32; toluene, 0.53; biphenyl and naphthalene, 0.10. The results average about one-third of the corresponding values for radiolysis at room temperature. (Author)

AD-434 058 Div. 4
OTS price $2.60

Stanford Research Inst., Menlo Park, Calif.
SYNTHESIS OF POTENTIAL ANTIRADIATION DRUGS.
Annual Summary Rept. (Final) 1 Oct 62-31 Mar 64, by Leon Goodman, James E. Christensen and Sandra L. Holton. 31 Mar 64, 23p. Rept. no. 56
Contract DA49 193MD2068, Proj. SRI BU3027
Unclassified report

Descriptors: (*Radioprotective agents, Synthesis), (*Drugs, Radioprotective agents), (*Thiols, Radioprotective agents), Sulfur compounds, Heterocyclic compounds, Chemical properties, Chemistry.

The synthesis of 6-acetamido-1,2,3,4-tetra-O-acetyl-6-deoxy- -L-idothiapyranose was completed. This represents an interesting type of sugar that contains sulfur as the heterocyclic ring atom and possesses a neighboring N-acetyl group. An extension of this synthetic method can probably be used to give the free sugar, 6-amino-6-deoxy-5-thio-L-idose, an interesting substituted Beta-mercaptoethylamine. Tryptamine was mercaptoethylated to yield N-(2-mercaptoethyl)-tryptamine hydrochloride. A number of ethylenimines were converted to thiols, Bunte salts, and isothiuronium salts. The most extensive group of compounds of this type came from the reaction of DL-propylenimine with meso-1,2:3,4-diepoxybutane that gave three stereoisomeric bis-aziridines. The bisaziridines in turn were converted to the respective bis-thiols, bis-Bunte salts, and bis-isothiuronium salts. (Author)

AD-434 081 Div. 4, 16
OTS price $1.60

Northwestern Technological Inst., Evanston, Ill.
GROSS CHEMICAL CHANGES OF HUMAN WASTE UNDERGOING THERMAL DECOMPOSITION,
by J. E. Quon, W. O. Pipes and J. A. Logan. Oct 63, 11p.
Contract AF41 657 383, Proj. 8246, Task 8246 1
AAL TN62 13 Unclassified report

Descriptors: (*Sewage, Degradation), Combustion, Combustion products, Gas analysis, Algae, Heat, Carbon, Wastes (Sanitary engineering).

AD-434 229 Div. 4
OTS price $1.60

Notre Dame Univ., Ind.
SYNTHESIS AND EVALUATION OF POLYMERS WITH SPECIAL PROPERTIES,
by G. F. D'Alelio, R. C. Evers, T. Dehner and T. Hoffend. 25 Oct 63, 11p. Rept. no. 2
Contract DA11 022AMC169A
Unclassified report

Descriptors: (*Polymerization, Alkynes), (*Polymers, Synthesis (Chemistry)), (*Alkynes, Polymerization), Impurities, Alcohols, Esters, Chemical bonds.

AD-434 230 Div. 4, 17
OTS price $2.60

Missouri School of Mines and Metallurgy, Rolla.
DISSOLUTION RATES OF ZONE REFINED IRON AND STEEL IN HCl, H2SO4 AND NACl AQUEOUS SOLUTIONS,
by M. E. Straumanis, W. J. James and G. E. Welch. Feb 64, 27p. Technical rept. no. 6
Contract Nonr2296 03
Unclassified report

Descriptors: (*Iron, Corrosion), (*Steel, Corrosion), Chemical reactions, Solubility, Corrosive liquids, Hydrochloric acid, Sulfuric acid, Sodium compounds, Chlorides, Air, Hydrogen, Reaction kinetics, Zone melting, Iron alloys, Chemical analysis, Impurities.

Zone refined iron is slowly attacked by acids. Rates obtained in 0.5 N H2SO4 and HCl are 0.056 and 0.023 mg/sq. cm/hr respectively at 25 C in the presence of air. In hydrogen the dissolution rates are slower. In a 3% NaCl solution the rate is about one fifth of that in 0.5 N HCl. The order of reaction starting with I N H2SO4 is above 2, indicating that the rate is unduly slowed down at low concentrations of the acid and that the resistance to corrosion decreases with increasing concentration of the acid. The dissolution rates of two steels containing among other impurities 0.44 and 0.85% C respectively, were determined in various concentrations (up to 7 N) of H2SO4 and HCl as a function of temperature (between 15 and 25 C). (Author)

AD-434 239 Div. 4
OTS price $5.60

Redondo Beach, Calif.
RESEARCH ON TRIPLET STATES AND PHOTOCHROMISM.
Rept. no. 4 (Annual), 1 Jan 63-24 Jan 64, by D. Weber and M. W. Windsor. 24 Jan 64, 54p.
Rept. no. 8645 6009RU000
Contract AF41 609 1457
Unclassified report

Descriptors: (*Flashblindness, Optical filters), (*Photochromism, Aromatic compounds), (*Absorption spectrum, Aromatic compounds), Polycyclic compounds, Hydrocarbons, Atomic energy levels, Excitation, Fluorescence, Acrylic resins, Lenses, Eyeglasses, Plastics, Plastic lenses.

Research studies are described on the photochromic properties of the triplet states of aromatic compounds and their application to the problem of eye-protection against nuclear weapons. A Cary spectrophotometer has been specially modified to allow the transmission of a sample to be measured while it is under irradiation by a repetitively triggered flash lamp. Using this apparatus, triplet-triplet absorption spectra have been recorded for

several new compounds in plastic media. Coronene, naphthocoronene and naphthochrysene are all found to have strong T-T absorption extending over most of the visible region. (Author)

AD-434 262 Div. 4
OTS price $1.10

Tulane Univ., New Orleans, La.
(No title).
Quarterly progress rept. no. 2, Sep-31 Dec 63, by Hans B. Jonassen. 31 Dec 63, 10p.
Contract DA18 108AMC186A
Unclassified report

Descriptors: (*Nitrates, Chromyl radicals). (*Chromyl radicals, Nitrates). (*Titanium compounds, Nitrates). Stability, Decomposition, High pressure research, Pressure vessels, Storage, Pyrolysis, Synthesis (Chemistry).

AD-434 269 Div. 4
OTS price $1.10

University of Southern California, Los Angeles.
ENHANCEMENT OF P-H BONDING IN A PHOSPHINE BORINE, by Anton B. Burg. 1 Apr 64, 7p. Technical rept. no. 11
Contract Nonr228 13 Task NR052 050
Unclassified report

Descriptors: (*Phosphines, Chemical bonds), (*Borines, Complex compounds), (*Hydrogen compounds, Chemical bonds), (*Chemical bonds, Phosphines), Hydrides, Deuterated compounds, Molecular spectroscopy, Spectra (Infrared), Boron compounds.

AD-434 285 Div. 4
OTS price $2.60

Feltman Research Labs., Picatinny Arsenal, Dover, N.J.
GAS ADSORPTION ON AN ORGANIC SURFACE: HMX, by Phillip Rochlin. Mar 64, 24p.
DA Proj. 503 05 021
PA TR3092 Unclassified report

Descriptors: (*HMX, Adsorption), (*Adsorption, Gases), Explosive materials, Nitrogen, Carbon compounds, Monoxides, Surface area, Crystals.

Attempts to measure adsorption on the surface of HMX using N2 and CO with the continuous flow modification of the BET gas adsorption technique were unsuccessful. Either (1) no adsorption takes place on the HMX under these conditions, (2) the gas adsorption technique is not sensitive enough to be used to measure the area of a surface as inactive as that of HMX, or (3) the adsorption which actually takes place is masked by effects due to heretofore unoberved polymorphic changes in the crystalline structure of the material. Heating the HMX crystals to about 185 C, well below the melting point, does not activate the surface, but results rather in amount of decomposition. (Author)

AD-434 286 Div. 4
OTS price $1.60

Reaction Motors Div., Thiokol Chemical Corp., Denville, N.J.
KINETICS OF CONDENSATION FROM THE VAPOR PHASE. Annual summary rept., by Welby G. Courtney. Apr. 64, 15p. Rept. no. 5515F
Contract Nonr4154 00
Unclassified report

Descriptors: (*Vapors, Condensation), (*Reaction kinetics, Nucleation), (*Condensation, Reaction kinetics), Water vapor, Magnesium compounds, Oxides, Theory, Integral equations, Cloud chambers, Shock tubes, Phase studies.

AD-434 296 Div. 4
OTS price $1.10

Wisconsin Univ., Madison.
REACTIONS BETWEEN TERTIARY AMINES AND ORGANO-HALOGENATING AGENTS.
Semiannual rept. no. 3, 1 July 63-1 Jan 64, by Takeru Higuchi. 30 Jan 64, 10p.
Contract DA18 108AMC209A
Unclassified report

Descriptors: (N-heterocyclic compounds, Ketones), (*Amines, Exchange reactions), Chlorine compounds, Decomposition, Hydrolysis, Volumetric analysis, Buffers, Acetates, Phosphates, Chemical equilibrium, Piperidines, Ph, O-heterocyclic compounds, Organic sulfur compounds, Organic nitrogen compounds.

AD-434 299 Div. 4
OTS price $1.60

Frick Chemical Lab., Princeton Univ., N. J.
EFFECT OF PLASTICIZER, CHAIN ENDS AND COMONOMER ON THE GLASS TRANSITION TEMPERATURE OF POLYMERS, by M. C. Shen and A. V. Tobolsky. Apr 64, 16p. Technical rept. no. RLT75
Contract Nonr1858 07, Proj. NR356 377
Unclassified report

Descriptors: (*Polymers, Crystal structure). (*Crystal structure, Polymers). Transition temperature, Plasticizers, Molecular structure, Styrene plastics, Viscoelasticity, Copolymerization, Molecular weight, Theory, Mathematical analysis.

At low concentrations of plasticizer, chain ends or comonomer, their effect on the glass transition temperature of a polymer can be described by a linear equation with respect to the weight fraction. Over the entire range of composition, these effects can be approximately described by a quadratic equation. The interrelation of all of these equations is discussed and considered. (Author)

AD-434 442 Div. 4
OTS price $1.60

Aerospace Corp., Los Angeles, Calif.
AQUEOUS BEHAVIOR OF ALUMINUM OXYCHLORIDE, by B. Siegel and R. L. Johnson. 2 Mar 64, 14p.
Rept. no. TDR 269 4210 10 5
Contract AF04 695 269
SSD TDR64 22 Unclassified report

Descriptors: (*Aluminum compounds, Oxychlorides), (*Oxychlorides, Hydrolysis), Solutions, Water, Pyrolysis, Hydrates, Synthesis (Chemistry), X-ray diffraction analysis, Electron diffraction analysis.

Contrary to a previous report, anhydrous A1OC1 dissolves readily in water to form a solution that is stable toward hydrolysis, even at 100 C. Concentrated solutions disproportionate appreciably to aluminum trichloride and aluminum

oxide at 100, but not at 60 C. The strong conductance of aqueous A1OC1 solutions, combined with freezing point depression data, indicate that dissolved A1OC1 is polymerized. A crystalline hydrate A1OC1.2.5H2O has been isolated. Pyrolysis of this hydrate at 100 C leads to the formation of a lower hydrate, approaching the composition A1OC1.H2O. At temperatures of 200-300 C, pyrolysis of the hydrate leads to an almost anhydrous A1OC1. However, these pryolytic dehydration reactions are accompained by a competing reaction which evolves HC1 and forms a1O(OH). The latter compound can be kept to a minimum by carrying out the pyrolysis at higher temperatures where dehydration requires shorter reaction times; data indicate that the dehydration reaction is more temperature dependent than is the reaction forming A1O(OH) + HC1. (Author)

AD-434 538 Div. 4
OTS price $4.60

Chicago Univ., Ill.
PROPERTIES OF SOLUTIONS OF METALS IN MOLTEN SALTS.
Final technical rept.,
by Norman H. Nachtrieb. 26 Jan 64, 42p.
Contract AF49 638 1076
AFOSR 64 0295 Unclassified report

Descriptors: (*Salts, High-temperature research), (*Thallium, Physical properties), Thallium compounds, Halides, Nitrates, Perchlorates, Absorption spectrum, Electrical conductance, Magnetic properties, Nuclear magnetic resonance, Surface tension, Ions, Valence, Iodine, Iodides, Ionization, Bismuth compounds, Laboratory furnaces, Design, Ultraviolet spectrophotometers, Sulfates.

Research into the properties of molten salts followed five lines of investigation (1) nuclear magnetic resonance, (2) electrical conductance, (3) surface tension, (4) magnetic susceptibility, and (5) absorption spectra. Progress in each is summarized. (Author)

AD-434 555 Div. 4
OTS price $7.60

Milan Univ. (Italy).
NEW HYDRIDES OF TRANSITION METALS.
Final rept.,
by Lamberto Malatesta. 1 Nov 63, 69p.
Contract AF EOAR62 34
AFOSR 64 0297 Unclassified report

Descriptors: (*Complex compounds, Synthesis (Chemistry)), (*Phosphorus compounds, Complex compounds), (*Rhodium compounds, Complex compounds), (*Rhenium compounds, Complex compounds), (*Iridium compounds, Complex compounds), (*Cobalt compounds, Complex compounds), (*Hydrogen compounds, Complex compounds), Aromatic compounds, Polycyclic compounds, Spectra (Infrared), Dipole moments, Nuclear magnetic resonance, Molecular isomerism, Perchloric acid, Metalorganic compounds, Perchlorates, Chlorine compounds, Bromine compounds, Iodine compounds, Carbonyl group, Copper compounds, Reports, Chemical reactions, Hydrides, Phosphines.

AD-434 557 Div. 4
OTS price $1.60

Chicago Univ., Ill.
OXIDATION OF AROMATIC COMPOUNDS BY ELECTRON TRANSFER.
Final rept., 1 June 61-30 May 63,
by Michael J. S. Dewar. 30 May 63, 13p.
Grant AF AFOSR62 104
AFOSR 64 0296 Unclassified report

Descriptors: (*Aromatic compounds, Oxidation), (*Oxidation, Aromatic compounds), Hydrocarbons, Benzene, Reaction kinetics, Oxidizers, Cobalt compounds, Manganese compounds, Acetates, Polycyclic compounds, Deuterated compounds, Chromatographic analysis, Synthesis (Chemistry).

AD-434 714 Div. 4
OTS price $3.60

Sheffield U. (Gt. Brit.).
FURTHER STUDIES OF IODINE ATOM RECOMBINATION.
Technical rept. no. 6 (Final), 1 June-31 Dec 63,
by George Porter and Syed K. Hussain. 31 Dec 63, 31p.
Contract DA91 591EUC2801
Unclassified report

Descriptors: (*Recombination reactions, Iodine), (*Iodine, Recombination reactions), (*Nitrogen compounds, Recombination reactions), Iodine compounds, Oxygen compounds, Thermochemistry, Photochemistry, Flash lamps, Heat of reaction, Halides, Molecular spectroscopy, Low-pressure research, High-temperature research, Laboratory equipment.

An experimental and theoretical investigation of the recombination of iodine atoms in the presence of nitric oxide is described. The work is aimed particularly at the resolution of the anomaly between calculated temperature coefficients and those which were measured by Porter, Szabo and Townsend (1962). Our more detailed calculations lead to a value of -11.45 kcal/ mole for the reaction of I and NO to yield NOI. A one meter long, high temperature, flash photolysis apparatus was constructed and preliminary measurements using this apparatus, although somewhat higher than the earlier ones, are still much lower than those calculated. (Author)

AD-434 814 Div. 4, 8
OTS price $1.10

Army Electronics Research and Development Agency, Fort Monmouth, N. J.
MECHANISM OF CESIUM IONIZATION,
by S. Schneider. Feb 64, 2p.
Task 1G6 22001A055 02 13
AELRDL TR2434 Unclassified report

Descriptors: (*Cesium, Ionization), (*Ionization, Theory), Thermionic converters, Gas discharges, Light, Catalyst, Voltage, Acceleration, Mathematical prediction, Atoms, Energy.

A theoretical model for the ionization of cesium vapor in the presence of a hot body and in the absence of an applied voltage sufficient to accelerate electrons to the ionization potential of cesium has been formulated. The model is predicated on an inelastic two-body collision mechanism involving cesium atoms excited by light radiated from a hot body. (Author)

AD-434 904 Div. 4, 14
OTS price $1.10

The Northern Polytechnic (Gt. Brit.).
HIGH-TEMPERATURE OR LOW-TEMPERATURE RESISTING ELASTOMERS CONTAINING BORON.
Final technical rept. no. 2, 1 Feb 63-31 Jan 64,
by W. Gerrard. 17 Feb 64, 10p.
Contract DA91 591EUC2809
Unclassified report

Descriptors: (*Elastomers, Boron compounds), (*Boron compounds, Vinyl plastics), (*Vinyl plastics, Boron compounds), (*Heat-resistant plastics, Boron compounds), (*Inorganic polymers, Boron compounds), Esters, Phosphonic acids, Chlorine compounds, Polycyclic compounds, Organic nitrogen compounds, Alkenes, Metalorganic compounds, Polymerization, Mercury compounds, Aromatic compounds, Chlorides, Complex compounds, Synthesis (Chemistry).

The mole-scale production of o-ethylphenylboron dichloride from o-ethylphenylmercury chloride led to the production of a polycondensate with bis (2-chloroethyl) vinylphosphonate. Vinyl polymerisation at some stage of the condensation was looked for; but correct conditions have not yet been found. (Author)

AD-434 905 Div. 4, 14
OTS price $3.60

Northern Polytechnic (Gt. Brit.).
HIGH-TEMPERATURE OR LOW-TEMPERATURE RESISTING ELASTOMERS CONTAINING BORON.
Final technical status rept. no. 2, 1 Feb 63-31 Jan 64,
by W. Gerrard. 17 Feb 64, 38p.
Contract DA91 591EUC2809
Unclassified report

Descriptors: (*Vinyl plastics, Boron compounds), (*Heat-resistant plastics, Vinyl plastics), (*Elastomers, Boron compounds), (*Boron compounds, Vinyl plastics), (*Inorganic polymers, Boron compounds), Chlorine compounds, Metalorganic compounds, Tin compounds, Esters, Phosphates, Phosphonic acids, Amines, Aromatic compounds, Organic nitrogen compounds, Polycyclic compounds, Organic phosphorus compounds, Mercury compounds, Polymerization, Nuclear magnetic resonance, Bromination, Benzene, Chlorides, Alkenes, Complex compounds, Synthesis (Chemistry).

AD-434 912 Div 4
OTS price $1 60

College of Advanced Technology, Birmingham (England).
ELECTRON AFFINITIES OF INORGANIC RADICALS.
Final technical rept , 1 Feb 63-31 Jan 64,
by F. M. Page 31 Jan 64, 11p.
Contract DA91 591EUC2808
Unclassified report

Descriptors: (*Free radicals, Ionization), (*Ions, Free radicals), Electrons, Nitriles, Alkenes, Sulfur compounds, Fluorine compounds, Nitrogen compounds, Oxides, Copper compounds, Oxides, Nitrates, Hydrogen peroxide, Magnetrons

Work has been devoted to the problem of substrates which are strongly adsorbed on the filament in the magnetron The results from tetracyanoethylene proved most illuminating with regard to understanding the general magnetron theory. Tetracyanoquinodimethine proved to have a low vapour pressure at room temperature and part of the apparatus has been reconstructed in order to allow heating of the magnetron envelope The work on SF6 which presented many complications, due to the strong oxidising powers of the SF5 radical, has been completed The compound SF6 is of considerable importance to the electrical industry as a gaseous dielectric Its high electrical breakdown properties are associated with the ease of formation of SF5 (-) ions The electron affinities of nitric oxide and nitrogen peroxide have been determined, and evidence found for the existence of an excited state of the NO2(-) ion which lies 92 kcals above its ground state Some preliminary work has been done using 50% aqueous hydrogen peroxide in an attempt to find the electron affinity of the important (OH) radical First results on the more dilute solution show the electron affinity of the OH radical to be higher than the presently favoured value (Author)

AD-434 972 Div. 4, 25
OTS price $1.10

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
TELLURIDES OF LANTHANUM,
by E. I. Yarembash, E. S. Vigileva, A. A. Eliseev, and L. I. Antonova. 29 Nov 63, 6p.
FTD MT63 249 Unclassified report

Trans. from Zhurnal Neorganicheskoy Khimii, AN SSSR, Vol. 8, No. 6, pp. 1542-1543, 1963.

Descriptors: (*Lanthanum compounds, Tellurides), (*Tellurides, Lanthanum compounds), Phase studies, Synthesis (Chemistry), Resistance (Electrical).

AD-434 980 Div. 4, 25
OTS price $2.60

West Virginia Pulp and Paper Co , Charleston, S. C.
ADSORPTION - DESORPTION PROPERTIES OF SORBENTS.
Bimonthly progress rept. no 2, 19 Jan-18 Mar 64,
by A. W. Loven and F. J. Vermillion 3 Apr 64, 22p
Contract DA18 035AMC106A
Unclassified report

Descriptors: (*Adsorption, Gases), (*Laboratory equipment, Measurement), Carbon, Porosity, Nitrogen, Phosphoric acids, Esters, Low-pressure research, Cryogenics, Impurities, Carboxylic acids, Phenols, Lactones, Quinones, Chromatographic analysis, Potassium compounds, Borohydrides, Sodium compounds, Hydroxides, Bicarbonates.

Apparatus for the study of equilibrium gas adsorption on solids by both volumetric and gravimetric means is described, including pressure measuring devices which allow measurements with adsorbates having a wide range of volalilities Adsorption and desorption isotherms of nitrogen at low temperatures are reported on an activated carbon fiber and on a coal-based granular carbon. The adsorption isotherm of dimethyl methylphosphonate, DMMP, on an activated carbon fiber at 25 C in the range of 0-0 8 mm Hg pressure is reported Methods are described for the chemical characterization of surface oxygen complexes on activated carbon according to functional group. (Author)

AD-434 982 Div. 4, 25, 10
OTS price $3.60

AeroChem Research Labs., Inc., Princeton, N. J.
CHEMI-IONIZATION AND CHEMILUMINESCENCE IN THE REACTION OF ATOMIC OXYGEN WITH C2H2, C2D2, AND C2H4,
by A. Fontijn, W. J. Miller and J. M. Hogan.
Apr 64, 37p. Rept. no. TP88
Contract AF19 628 3302
Unclassified report

Descriptors: (*Hydrocarbons, Chemical reactions), (*Luminescence, Intensity), (*Oxygen, Chemical reactions), Ionization, Deuterated

compounds, Alkynes, Alkenes, Flames, Diffusion, Atoms, Excitation, Quenching (Inhibition), Free radicals, Carbon dioxide, Nitrogen compounds, Oxides, Helium, Microwave equipment, Emissivity, Spectra (Visible & ultraviolet), Mass spectroscopy, Spectrum analyzers, Ionic current, Ions, Low-pressure research, Molecular spectroscopy.

AD-435 087 Div. 4
OTS price $3.60

National Bureau of Standards, Washington, D. C.
PREPARATION AND POLYMERIZATION OF SOME PERFLUORODIENES,
by James E. Fearn and Leo A. Wall. Apr 64, 31p.
NBS Proj. 0702 11 07522
NBS 8318 Unclassified report

Report on Fluorocarbon Polymers.

Descriptors: (*Halogenated hydrocarbons, Fluorine compounds), (*Fluorine compounds, Polymerization), (*Polymerization, Halogenated hydrocarbons), Iodine compounds, Chlorine compounds, Synthesis (Chemistry), Chemical reactions, Chlorine, Fatty acids, Aldehydes.

Perfluorohexadiene was prepared by coupling 3-iodopentafluoropropene-1. Telomerization reactions were developed, which resulted in the preparation of precursors for perfluorohexadiene-1,5, perfluoroheptadiene-1,6, and perfluorooctadiene-1,7 from iodine monochloride, chlorotrifluoroethylene, and tetrafluoroethylene. Perfluorooctadiene, prepared from its precursor, polymerized readily under high pressure, and several polymer samples were obtained. These samples showed a high degree of cyclization as shown by infrared studies. (Author)

5. COMMUNICATIONS

AD-433 602 Div. 5, 8, 12
OTS price $3.60

Lincoln Labs., Mass. Inst. of Tech., Lexington.
DIVISION 6. SPACE COMMUNICATIONS.
Quarterly progress rept. no. 1, 1 Apr-30 Aug 63, by T. F. Rogers and G. P. Dinneen. 15 Sep 63, 25p.
Contract AF19 628 500
AFESD TDR63 592 Unclassified report

Descriptors: (*Communication systems, Spacecraft), (*Communication satellites (Passive), Scientific research), (*Space communications systems, Research program administration), Radio communication systems, Electronic equipment, Radio transmission, Surface-to-space, Radar equipment, Theory, Reflectors.

AD-433 717 Div. 5, 8
OTS price $3.60

University of Southern Calif., Engineering Center, Los Angeles.
SCATTER COMMUNICATION MODELS FOR SPACE VEHICLES,
by R.A. Scholtz. Jan 64, 38p. Rept. no. 104
Contract AF04 695 304, Proj. 3182 730F, Task 02
SSD TDR64 59 Unclassified report

Report on Detection and Tracking System Studies and Hypervelocity Impact Problems.

Descriptors: (*Space communication systems, Multipath transmission), (*Secret communication systems, Space communication systems), Spacecraft, Pulse communication systems, Correlation techniques, Coding, Optimization, Communication theory, Mathematical analysis, Scattering.

Communication over a multipath link is inherently a more difficult process than single path communication. Multipath communications are characterized by imperfect knowledge of signal waveforms when they arrive at a receiver. Under the assumption that this signal waveform is a sample function of a Gaussian random process, a pulse-amplitude-modulation communication system is designed. Optimum receiver data processing and optimum message encoding procedures are derived as a function of the signal and additive noise statistics. When the mean of the pulse signal waveform at the receiver is zero, the optimum code is orthogonal. On the other hand, when the covariance function of the Gaussian signal approaches zero, a regular simplex code provides optimum communications. (Author)

AD-433 847 Div. 5
OTS price $3.60

International Electric Corp., Paramus, N.J.
TEST REPORT FOR CATEGORY I ON-SITE INTEGRATION TESTS OF THE ELECTRONIC DATA TRANSMISSION COMMUNICATIONS CENTRALS, AN/FYQ-5, AT SAC HEADQUARTERS, OFFUTT AFB AND 8TH AF HEADQUARTERS, WESTOVER AFB.
Jan 64, 32p.
Contract AF19 626 8
ESD TDR64 175 Unclassified report

Descriptors: (*Data transmission systems, Air Force), Communication equipment, Communication systems, Performance (Engineering), Digital systems, Errors, Strategic Air Command, Command & control systems.

The debugging, dry run, and formal test activities are described for the Category I, Part II integration (crosstell) testing of the SAC 465L System Electronic Data Transmission Communications Centrals located at Offutt Air Force Base, and Westover Air Force Base. (Author)

AD-433 884 Div. 5, 8
OTS price $15.00

ITT Federal Labs., Nutley, N. J.
APPLIED RESEARCH STUDY ON SATELLITE COMMUNICATIONS. VOLUME 2.
Quarterly progress rept. no. 4, 1 Apr-30 June 63, by D. Campbell, M. Epstein, E. Pflumm, P. Cheilik and A. Werth. Oct 63, 1v.
Contract DA36 039sc90886, Proj. 3A991 12 001
Unclassified report

Descriptors: (*Communication satellites (Active), Radio communication systems), Radio relay stations, Radio interference, Correlation techniques, Band width, Radio transmission, Mobile, Radio stations, Soils, Mechanical properties, Position finding, Geodesics, Errors, Speech compression, Electromagnetic lenses, Reflectors, Research program administration, Multiple operation.

AD-434 029 Div. 5,28
OTS price $1.60

RAND Corp., Santa Monica, Calif.
COMMUNICATIONS, SEMANTICS, AND INFORMATION SYSTEMS,
by L. S. Hill. Mar 64, 18p. Rept. no. P2882
Unclassified report

Division 5 - COMMUNICATIONS

Descriptors: (*Communication theory, Language, (*Language, Social communication), (*Voice communication system, Stimulation), (*Bionics, Communication theory), Social communication, Psychometrics, Theory, Speech, Management engineering, Scheduling, Control systems.

AD-434 182 Div. 5
OTS price $5.60

Bell Telephone Labs., Inc., Whippany, N.J.
UNICOM. UNIVERSAL INTEGRATED COMMUNICATION SYSTEM.
Progress rept. no. 18, 1 Oct-31 Dec 63.
31 Dec 63, 56p.
Contract DA36 039sc78806, Proj. 3 55 00 200
Unclassified report

In cooperation with International Telephone and Telegraph Corp., Nutley, N.J. and Radio corporation of America, New York, N.J.

Descriptors: (*Communication systems, Military requirements), (*Global communication systems, Military requirements), Teletype systems, Radio communication systems, High frequency, Digital systems, Pulse modulation, Coding, Programming (Computers), Data transmission systems, Input-output devices, Multiplex, Facsimile communication systems.

In System Engineering, system requirements for disposition of blocked store and forward messages were specified and teletypewriter input messages necessary for control of the store and forward units were reviewed. Use of the Test Model to demonstrate inter-switching-center call and message handling was investigated and a plan to simulate a three-switching-center configuration with the Test Model equipment was devised. Digital transmission tests over an HF radio link were continued and performance confirmed as being unsuitable for Test Model use. In the Test Model development program, all items not previously suspended are undergoing systems equipment tests. The central processor has exercised all units controlled by it with the use of special test programs. Central controls are operational in the simplex modes, and PCM and vocoded speech were switched through the time division switch. (Author)

AD-434 335 Div. 5, 19
OTS price $8.10

Southwest Research Inst., San Antonio, Tex.
COMPARISON OF TECHNICAL SPECIFICATIONS FOR THREE TWIN/TRIPLE CHANNEL HF RECEIVERS.
Task summary rept. no. 18, 1 Dec 63-29 Feb 64,
by W. M. Sherill and Douglas N. Travers. 29 Feb 64, 98p.
Contract NObsr89167, Proj. SF0010801, Task 9258
Unclassified report

Descriptors: (*Channel selectors, Radio reveivers), (*Radio receivers, Channel selectors), (*Radio receivers, Specifications), (*Direction finding, Radio receivers), Design, Calibration, Bandwidth, Shipborne, Operation, Stability, High frequency, Direction finding, Automatic gain control, Tuned circuits, Frequency converters, Medium frequency.

A comparative summary of the technical specifications of these receivers with price and delivery information is presented. Receiver specifications include phase and gain match tolerances, stability of matching, channel calibration, sensitivity, bandwidths, conversions, and other receiver characteristics. The capability of these receivers for modern shipboard direction finding applications is reviewed in detail. Particular areas of interest include receiver AGC, future adaptability to frequency synthesizer tuning, counter readout of tuned frequency, and bearing display. It is concluded that the IR-3 receiver (which is also the most recent design) is the optimum equipment on the basis of the capabilities. (Author)

AD-434 554 Div. 5, 8
OTS price $9.10

Stanford Research Inst., Menlo Park, Calif.
HF COMMUNICATION EFFECTS SIMULATION: INSTRUMENTATION AND OPERATION OF THE FIELD EXPERIMENT.
Interim rept. 3,
by R. A. Shepherd. Dec 63, 103p.
Contract DA36 039sc87197 SRI Proj. 3670
Unclassified report

Descriptors: (*Radio signals, Propagation), (*Ionospheric disturbances, Radio signals), High frequency, Mathematical models, Aurorae, Attenuation, Radio stations, Ionospheric propagation, Nuclear explosions, Simulation, Radio equipment, Instrumentation, Measurement.

The field-test phase of the experiment consists of an examination of six propagation paths, some of which pass through the auroral zone and some of which are south of the zone. These six paths are examined with oblique-incidence ionosphere sounders which collect propagation data between 4 and 64 Mc. Two of the paths are also studied using a phase-stable CW system for the measurement of phase and amplitude of propagated signals. The primary equipment used in the experiment, consisting of Granger Associates ionosphere sounders and of a phase-stable CW system developed by SRI, is described in this report. (Author)

AD-434 793 Div. 5, 8
OTS price $14.00

General Electric Co., Syracuse, N. Y.
SATELLITE RATED MISTRAM TRANSPONDER STUDY.
Final rept.,
by J. Arrante, R. Boram, James Campbell and Ira Lazar. 1 Nov 63, 202p.
Contract AF19 628 2992, Proj. 5930, Task 593003
AFCRL 64 36 Unclassified report

Descriptors: (*Transponders, Spaceborne), Satellites (Artificial), Specifications, Design, Magnetrons, Power supplies, Modules (Electronic), Mixers (Electronic), Thermal stresses, Semiconductor devices, Environmental tests, Vibration, Low-pressure research, Radiation damage, Reliability (Electronics), Satellite antennas, Guided missile trajectories, Radar stations.

MISTRAM transponder is capable of operating in an orbiting satellite. This study considers the unusual environmental conditions that will exist in the proposed Calibration Satellite and the operational requirements that must be met for successful completion of the mission. It is also concerned with related hardware and activities, such as satellite antennas and field test equipment and programs. (Author)

AD-434 835 Div. 5, 30
OTS price $10.50

Stanford Research Inst., Menlo Park, Calif.
THE NETWORK ROUTING AND EVALUATION PROGRAM.
Final rept.,
by M. Pollack and G.F. Wallace. Dec 62, 134p.
Rept. no. TR9
Contract DA36 039SC85052, SRI Proj. 3340
Unclassified report

Descriptors: (*Communication systems, Networks), (*Programming (Computers), Communication systems), Radio transmission, Real time, Digital computers, Operation, Military facilities, Military requirements, Selection.

Military communication networks can experience severe and rapid changes in both transmission capabilities and traffic demands. Consequently, real-time methods for obtaining optimal traffic routes are needed. Rapid methods are also needed to evaluate new networks or extensions to present networks. A digital computer program is described that can be used for these purposes. The general organization of the program is described, as is the purpose of each portion of the program. Detailed operation instructions are given, specifying all the inputs and outputs. A sample network problem is presented. Flow charts of the program are appended. Finally, possible future extensions to the program are enumerated. (Author)

AD-434 836 Div. 5
OTS price $3.60

Stanford Research Inst., Menlo Park, Calif.
COMPARISON OF PRECIPITATION AND TROPOSPHERIC SCATTERING CROSS SECTIONS,
by F.G. Fernald and A.S. Dennis. Jan 64, 31p.
report no. TRI
Contract DA36 039SC90859, SRI Proj. 4172
Unclassified report

Descriptors: (*Troposphere, Scattering), (*Radiocommunication systems, Interference), (*Interference, Atmospheric precipitation), Rainfall, Hail, Radar reflections.

This report provides a means of identifying cases where precipitation scatter becomes predominant on scatter links. Two scattering cross sections, that of gaseous components of the atmosphere ane that of precipitation particles, if present, are derived as functions of path length, beamwidth, frequency, and weather conditions. Results for the case with both antennas directed at the horizon and uniform precipitation in the common volume are summarized on a nomogram for ease in comparing the two scattering cross sections. (Author)

AD-434 856 Div. 5
OTS price $8.10

Stanford Research Inst., Menlo Park, Calif.
METHODS FOR DETERMINING OPTIMAL TRAFFIC ROUTES IN LARGE COMMUNICATION NETWORKS.
Final technical rept. 8
by M. Pollack and G. Wallace. June 62, 89p.
Contract DA36 039SC85052, Proj. 3340
Unclassified report

Descriptors: (*Communication systems, Networks), (*Networks, Military requirements), (*Military requirements, Communication systems), (*Digital computers, Programming (Computers)), (*Mathematical prediction, Digital computers), Traffic, Linear systems, Time, Teletype systems.

Military communication networks can experience severe and rapid changes in both transmission capabilities and traffic demands. Consequently, real-time methods for obtaining optimal traffic routes are needed. Three methods, utilizing digital computers, are shown to be feasible. Two are linear programming formulations; the third is a sequential assignment method. All three are applicable to directed networks with no more than 15 relay stations; only the third method is presently applicable to larger networks. The relative merits of each method and computer timing estimates are given. (Author)

AD-434 875 Div. 5, 6
OTS price $1.60

Cruft Lab., Harvard U., Cambridge, Mass.
OPTIMUM PULSE SHAPES FOR TRANSMITTERS WHICH ARE BOTH PEAK POWER LIMITED AND AVERAGE POWER LIMITED,
by Donald W. Tufts and David A. Shnidman. 12 Nov 63, 16p. TR 428
Contract Nonr1866 16, Proj. NR372 012
Unclassified report

Descriptors: (*Pulse transmitters, Matched filters), (*Matched filters, Pulse transmitters), Mathematical analysis, Equations, Theory, Radiofrequency power, Radiofrequency pulses.

For any stable linear system, an explicit formula is derived for the input waveform p(t) which maximizes the output waveform amplitude at a prescribed time instant. The problem and the results are closely related to the matched filter problem of radar theory and the bang-bang problem of optimal control theory. In addition to the obvious direct applications in signal design, the results can also be used indirectly since they provide a standard of performance for more realistic situations where additional constraints are important. (Author)

6. DETECTION

AD-433 516 Div. 6, 2, 20
OTS price $1.10

Institute of Science and Tech., Univ. of Michigan, Ann Arbor.
VESIAC MONTHLY BULLETIN OF VELA UNIFORM RESEARCH PUBLICATIONS.
15 Jan 64, 7p. Bulletin no. 12
Unclassified report

Descriptors: (*Detections, Nuclear explosions), (*Bibliographies, Detections), Scientific research, Underground explosions, Seismic waves.

AD-433 523 Div. 6
OTS price $6.00

Litton Systems, Inc., Waltham, Mass.
SPACE-TIME CORRELATION FUNCTION OF SURFACE GENERATED NOISE AND APPLICATION TO A HYDROPHONE ARRAY PROBLEM,
by Jay Edie. 1 Oct 63, 62p. Rept. no. TR63 9BF
Contract NOnr 3320 00
Unclassified report

Descriptors: (*Hydrophones, Signal-to-noise ratio), Ocean bottom, Oceans, Surfaces, Background, Noise, Mathematical analysis, Optimization, Statistical functions.

The purposes of this report are: (1) to discuss the use of noise field space-time correlation functions in the design of hydrophone arrays; (2) to compute the space-time correlation function of the noise believed to exist in the deep ocean; and (3) to present examples of array designs with signal-to-noise ratio (SNR) and beam pattern comparisons. (Author)

Division 6 - DETECTION

AD-433 733 Div. 6, 1
OTS price $1.60

Naval Research Lab., Washington, D. C.
DISPLAY FIELD ENLARGEMENT THROUGH PERIPHERAL PRESENTATION OF EXTRA-FIELD ERROR,
by E. A. Cook and C. L. Tipton. Feb 64, 15p.
NRL MR1506 Unclassified report

Descriptors: (*Naval aircraft, Display systems), Gun sights, Command and control systems, Pilots, Oscilloscopes, Visual signals, Optical tracking, Test methods, Errors.

Present optical display systems such as Head-Up subtend relatively small visual fields. Operationally, command, control and error signals are likely to exceed a restricted display field. This produces a condition of extra-field error wich results in a critical loss of visual control information. This report provides a technique of peripherally extending a display field by presenting extra-field error in the form of an arc at the display's edge. Two experiments were conducted which characterized the influence of (a) limiting display conditions (b) peripherally extended display conditions and (c) non-limiting display conditions. The results indicate that the technique of peripheral display extension overcomes the adverse effects of display limiting. Infact, performance with a peripherally extended display was found to be comparable to performance obtained under a non-limiting display condition. In addition, the results indicate performance deteriorates when the ratio of the peripheral to the central display gain is less than one. (Author)

AD-433 775 Div. 6, 25
OTS price $3.60

Bell Telephone Labs. Inc., Murray Hill, N. J.
SOLID-STATE MASER RESEARCH (OPTICAL).
Quarterly rept. no. 1, 15 July-14 Nov 63,
by J. E. Geusic, J. Koningstein, H. E. D. Scovil and W. P. Unruh. 14 Nov 63, 39p.
Contract DA36 039AMC02333E, Proj. 3A99 21 001
Unclassified report

Descriptors: (*Lasers, Garnet), Yttrium, Aluminum, Impurities, Neodymium, Rare earths, Ions, Europium, Erbium, Symmetry (Crystallography).

Part I gives a brief report on the first successful demonstration of pulsed and CW optical maser oscillations in Nd:YAG. Part II is a rather detailed discussion of crystal field calculations for some of the states of trivalent rare-earth ions in YAG. Particular emphasis is given to a discussion of the Nd (3+) spectrum in YAG. (Author)

AD-433 859 Div. 6, 25
OTS price $5.60

Upper Air Research Labs., U. of Utah, Salt Lake City.
AEROSPACE VEHICLE DETECTION STUDIES.
Program progress rept., 1 Dec 63-29 Feb 64.
29 Feb 64, 52p.
Contract AF04 695 339
Unclassified report

In cooperation with Electro-Dynamics Labs., Utah State Univ., Logan.

Descriptors: (*Aerospace craft, Detection), (*Aerospace planes, Detection), Boost glide vehicles, Ultraviolet radiation, Satellites (Artificial), Recombination reactions, Interferometers, Target recognition, Optical tracking, Spectrum analyzers, Optical instruments, Exhaust flames, Exhaust gases, Rocket motors, Optical scanning.

AD-433 916 Div. 6, 25
OTS price $14.00

Northrop Corp., Hawthorne, Calif.
ANALYSIS OF SERVOMECHANISMS FOR CONTROL OF ELECTRO-OPTICAL SURVEILLANCE TELESCOPES,
Dec 63, 204p. Rept. no. 63 294
Contract AF33 657 8990, Proj. 4122, Task 412208
RTD TDR63 4295 Unclassified report

Descriptors: (*Tracking telescopes, Control systems), (*Servomechanisms, Tracking telescopes), Television systems, Mathematical models, Optical tracking, Tachometers, Mirrors, Lasers, Errors, Television cameras, Image tubes.

An analysis of the control system for the Electro-Optical Surveillance Telescope at Cloudcroft, New Mexico, is presented. The tracking accuracy of the system is evaluated in terms of the limitations imposed by the dynamics of the control system, deflections of the telescope structure, and stability of the target sensing system. Analytical and digital simulation techniques are used to fix the parameter values and determine the effects of the system component non-linearities. Detailed analyses concerning the TV sensing system and the telescope structure are presented. Methods to correct or compensate the major error sources are discussed, and a test procedure is outlined to measure the magnitudes of the errors. The mechanical system analysis and the digital simulation program are included as appendices. (Author)

AD-434 232 Div. 6
OTS price $1.10

Melpar Inc., Falls Church, Va.
DESIGN AND DEVELOPMENT OF A PERSONNEL-VEHICULAR DISCRIMINATOR.
Monthly letter progress rept. no. 15, 1 Jan-1 Feb 64,
by L. B. Wickersham. 11 Feb 64, 3p.
Contract DA36 034ORD3713
Unclassified report

Descriptors: (*Detectors, Seismic waves), Terrain, Target discrimination, Test equipment, Tests.

AD-434 784 Div. 6, 12
OTS price $7.60

Oklahoma State U., Research Foundation, Stillwater.
DESIGN, DEVELOPMENT, AND CONSTRUCTION OF MICROMETEORITE DETECTION SYSTEMS.
Final rept.,
by Samuel S. Clapp and Richard F. Buck.
Dec 63, 75p.
Contract AF19 604 5715, Proj. 7667, Task 766702
AFCRL 64 98 Unclassified report

Descriptors: (*Detection, Meteorites), (*Meteorites, Detection), (*Detectors, Spaceborne), Data processing systems, Design, Acoustics, Sensitivity, Electronic equipment, Calibration, Analog-digital computers, Modules (Electronics), Circuits, Satellites (Artificial).

Development of micrometeorite detection systems

to be employed on specific satellite vehicles is discussed. Historical background is presented on micrometeorite phenomena and the general theory of the acoustic technique for micrometeorite detection. Development of the detection system was the result of combining a suitable sensor assembly an ultrasensitive amplifier and a digital to analog computer, to bether with a compatible DC to DC power converter. An engineering revision in the amplifier, discriminator and DC to DC power converter was later proposed and authorized. Subsequent developments in production requirements and modifications which led to Model D14DN01A-B-C are presented. The calibration technique employed for the early micrometeorite detection system is compared to a unique ''Electronic Striker'' which was used for calibration on later odels. Data from three micrometeorite detection systems, which were flown on the satellite 1961 alpha 1, were evaluated. (Author)

AD-435 001 Div. 6
OTS price $2.60

Biotechnology Lab., U. of Calif., Los Angeles.
PERFORMANCE STUDIES ON THE NOTS-UCLA TRACKING SIMULATOR WITH TWO OPTICAL SYSTEMS AND A SWITCHING OPTION,
by David R. Garfinkle, Hilde Groth and John Lyman.
Dec 63, 27p. Rept. no. 63-67; TR23
Contract N123 60530 23558
Unclassified report

Descriptors: (*Optical tracking), Feasibility studies, Display systems, Errors, Performance (Engineering), Target acquisition, Optical equipment, Simulators, Tracking, Simulation, Binoculars.

An experiment was performed on the NOTS-UCLA Tracking Simulator to test the feasibility of using a mechanical switching device to switch between two optical systems in an effort to combine the best effects of both. The beneficial effects of small probability of target loss and of easy reacquisition available with a large field of view and low power magnification (13 degrees, 1X) would thus be coupled with the lower tracking error generally obtained with optical systems employing limited field of view and moderate magnification (5 degrees, 5X). As expected, the 5 degrees, 5X optical display yielded significantly lower tracking error than the 13 degrees, 1X display. The inclusion of a switching option did not further improve performance. Theoretical considerations indicate that a switching device may be more beneficial for more difficult tasks and when initial acquisition is included as a part of the task. (Author)

AD-435 049 Div. 6
OTS price $3.60

Aerospace Corp., Los Angeles, Calif.
RELATIVE ACCURACY OF AZUSA AND DOWNRANGE GLOTRAC AT A POINT OF OVERLAPPING COVERAGE,
by J. L. Wittels. 30 Dec 63, 32p. Rept. no. TOR269 4116 22 2
Contract AF04 695 269
Unclassified report

Descriptors: (*Guided missile tracking systems, Errors), Guided missile ranges, Instrumentation, Communication satellites (Active), Tracking, C-band, Partial differential equations, Mathematical analysis, Radar tracking, Performance (Engineering).

7. ELECTRICAL EQUIPMENT

AD-433 532 Div. 7, 25
OTS price $1.10

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
CREATORS OF ANTI-REFLECTION COATED OPTICS,
by B. Grozorskiy. 9 Jan 64, 5p.
FTD TT63 1080 Unclassified report

Trans. from Leninskoye Znamya, p. 3, 2 June 59.

Descriptors: (*Optics, Reflection), (*Reflection, Inhibition), Design, Analysis, Effectiveness, Production, Photographic equipment.

AD-433 543 Div. 7
OTS price $1.60

Lockheed Aircraft Corp., Sunnyvale, Calif.
LITHIUM ANODE LIMITED CYCLE SECONDARY BATTERY.
Quarterly technical progress rept. no. 3,
by H. F. Bauman. 14 Mar 64, 15p.
Contract AF33 657 11709, Proj. 8173, Task 817304
Unclassified report

Descriptors: (*Batteries and components, Electrodes), (*Spacecraft, Batteries and components), (*Electrolytes, Storage batteries), Anodes (Electrolytic cell), Lithium, Cathodes (Electrolytic cell), Fluorides, Cobalt compounds, Copper compounds, Polarization, Organic solvents, Lactones, Aliphatic compounds, Carbonates, Organic sulfur compounds, Oxides, Sodium compounds, Fluorine compounds, Phosphates, Corrosion.

The lithium-cupric fluoride and lithium-cobaltic fluoride couples are being investigated on this program for development into high energy battery systems for space applications. These two couples are of interest because of their high energy to weight ratio; 746 watts hour/pound for the Li-CuF2 couple and 970 watt hours/pound for the Li-CoF3 couple. The development goal is a battery discharging between 22 and 30 volts and delivering 300 watts hour/pound during a 100 hour discharge. The battery should be capable of recharge and another discharge. Achievement of these goals would almost triple the useful flight time of a space vehicle or allow an equivalent increase in instrument load weight. (Author)

AD-433 616 Div. 7
OTS price $2.60

Gulton Industries, Inc., Metuchen, N. J.
LITHIUM-NICKEL HALIDE SECONDARY BATTERY INVESTIGATION.
Quarterly technical progress rept. no. 1,
by A. E. Lyall and H. N. Seiger. 16 Mar 64, 24p.
Contract AF33 615 1266, Proj. 8173, Task 817304
Unclassified report

Descriptors: (*Batteries and components, Alkaline cells), (*Electrodes, Batteries and components), Anodes (Electrolytic cells), Nickel compounds, Fluorides, Chlorides, Cathodes (Electrolytic cells), Lithium, Electrolytes, Aliphatic compounds, Carbonates, Aromatic compounds, Nitrates, Formamides, Hydrazine, Battery separators, Polyethylene plastics, Glass textiles, Halocarbon plastics, Acrylic resins, Polyvinyl chloride, Compatibility.

Propylene carbonate and nitrobenzene were found to be suitable as non aqueous solvents in the presence of lithium metal. All other solvents tested either reacted with the metal or were affected by the lithium. A satisfactory lithium electrode was produced by pasting an oil dispersion of lithium on an expanded metal grid. The addition on non aqueous binders has facilitated this operation. These electrodes have a capacity of 1.24 ampere-hours per square inch. (Author)

AD-433 803 Div. 7
OTS price $8.10

Societe d'Etudes, de Recherches et d'Application pour l'Industrie, Brussels (Belgium).
STUDY OF THE GENERAL PROPERTIES OF SOME MINERAL ION EXCHANGE MEMBRANES AS WELL AS THEIR POSSIBLE USE IN LOW TEMPERATURE FUEL CELLS.
Final rept. 1 Jan-30 Sep 63.
31 Oct 63, 87p. Rept. no. 1827 3
Contract DA91 591EUC2773
Unclassified report

Descriptors: (*Fuel cells, Ion exchange), (*Ion exchange, Membranes), (*Phosphates, Electrolytes), (*Membranes, Ion exchange), Tin compounds, Titanium compounds, Chemical equilibrium, Hydrogen, Oxygen, Electron microscopy, X-ray photography, Synthesis (Chemistry), Complex compounds, Niobium compounds, Mathematical models, Minerals, Molecular structure, Binders, Permeability, Transport properties, Phase studies, Electrical properties, Electrochemistry, Electric potential.

The purpose of this exploratory research was to examine the possibilities of using some mineral ion exchangers as electrolytes in a low temperature fuel cell. The ion exchangers considered belonged to the family of phosphates of heavy metals such as tin, titanium, niobium and germanium. The following points were examined in detail: physico-chemical properties of the phosphates; exchange properties; solubilities; densities; thermodifferential analysis of the metal phosphates. It appears that tin and titanium phosphates are difunctional exchangers with exchange capacities of 6 to 8 milli-equivalents per gram of exchanger at pH 6. These values are comparable to corresponding values for organic ion exchange resins. A model for the exchange mechanism of difunctional exchangers is also proposed. The principle of the model is that the two exchange functions of the difunctional exchanger take part in the exchange one after the other. (Author)

AD-433 856 Div. 7
OTS price $26.00

General Electric Co., Philadelphia, Pa.
HYDROGEN-OXYGEN PRIMARY EXTRATERRESTRIAL (HOPE) FUEL CELL PROGRAM.
Final rept., June 62-Oct 62,
by L. Chapman, C. Snyder, H. Marderness, B. Zeldin and W. S. Losew. Jan 63, 580p.
Contract AF33 657 8960
Unclassified report

Descriptors: (*Fuel cells, Spacecraft), (*Energy conversion, Fuel cells), (*Electric power production, Fuel cells), Hydrogen, Oxygen, Manufacturing methods, Performance (Engineering), Compatibility, Titanium, Design, Control systems, Space environmental conditions, Printed circuits, Modules (Electronic), Transistors, Diodes (Semiconductors), Weightlessness, Thermistors, Pneumatic systems, Shock (Mechanics), Vibration, Electric potential, Structural parts.

AD-433 871 Div. 7
OTS price $3.60

Little, Arthur D., Inc., Cambridge, Mass.
LOW TEMPERATURE OPERATION OF BATTERIES.
Quarterly progress rept. no. 5, 15 Sep-14 Dec 63, by R. A. Horne and D. L. Richardson. 14 Dec 63, 32p.
Contract DA36 039sc90706, Proj. 1G6 22001A053
Unclassified report

Descriptors: (*Batteries & components, Primary cells), (*Primary cells, Low-temperature batteries), (*Low-temperature batteries, Performance (Engineering)), Dry cells, Magnesium, Specific heat, Thermal insulation, Low-temperature research.

Common Leclanche cells can deliver currents in the hundred microamp range even at very low temperature (-55 F). Measurements of the thermal masses of batteries indicate that they can be approximated by the thermal masses of their constituent cells. Inclusion of a term for the insulating effect of the air space between a battery and its insulation has improved the prediction of battery cool-down rates; however, the agreement between predicted and observed cool-down rates for multi-cell batteries with internal air spaces and/or sealing material is still poor. The advantage in weight capacity (watt-hr per unit weight relationship) of an insulated battery to be gained by increased thickness of insulation begins to level off at about 0.6 in. for expanded polystyrene. Analysis shows that for a given insulation there is a maximum attainable fraction of the +70 F volume capacity (watt-hr per unit volume relationship). For short missions this maximum is approached by thin insulation and for long missions by thick insulation. The effect of initial battery and ambient temperatures on weight capacity has been examined. The attainable fraction of the +70 F weight capacity increases rapidly with increasing battery thermal mass but tends to level off at higher masses. The effect of the thermal conductivity of the insulation on the weight capacity has also been examined. (Author)

AD-433 973 Div. 7
OTS price $7.60

Naval Ordnance Lab., Corona, Calif.
SIXTH SYMPOSIUM ON AMMONIA BATTERIES AT UNIVERSITY OF CALIFORNIA, BERKELEY, CALIFORNIA. JANUARY 30-31, 1964.
28 Jan 64, 75p.
NOLC 597 Unclassified report

Descriptors: (*Symposia, Batteries and components), (*Low temperature batteries, Ammonia), (*Ammonia, Low temperature batteries), Electrolytes, Electrodes, Solutions, Liquefied gases, Sulfoxides, Nitrobenzenes, Silver, Silver compounds, Chlorides, Lithium compounds, Carbonates, Alkenes, Electrochemistry, Statistical analysis.

These periodic meetings are scheduled to encourage detailed discussion among all government agencies and their contractors active in ammonia battery research and development. Review of theoretical and experimental problems and of methods applicable to their solution is of vital interest and benefit to everyone in the field. Cooperative program planning, orientation to long-range military requirements, and promotion of increased fundamental research in nonaqueous electrochemistry are additional goals. This report contains the extended abstracts furnished in advance by the speakers, reprinted as received

The actual proceedings of the symposium will not be transcribed or abstracted as they were in previous years. (Author)

AD-434 022 Div. 7
OTS price $1.60

Naval Ordnance Lab., Corona, Calif.
SIXTH SYMPOSIUM OF AMMONIA BATTERIES AT UNIVERSITY OF CALIFORNIA, BERKELEY, CALIFORNIA, JANUARY 30-31, 1964. (SUPPLEMENT).
15 Mar 64, 17p.
NOLC 597 suppl. Unclassified report

Descriptors: (*Ammonia, Batteries & compnents), (*Symposia, Batteries & components), Cathodes (Electrolytic cell), Silver compounds, Chlorides, Liquefied gases, Magnesium, Carbon, Thiocyanates, Potassium compounds, Electric potential, Electrolytes, Nitrates, Aromatic compounds, Nitrobenzenes.

AD-434 025 Div. 7, 1
OTS price $1.10

Naval Air Test Center, Patuxent River, Md.
SERVICE SUITABLILITY EVALUATION OF GENERATOR DROUGUE LIGHTING KITS FOR THE D-704 AIR REFUELING STORE.
Final rept.
6 Mar 64, 6p.
Task RA1200001
NATC ST31 30R 64
Unclassified report

Descriptors: (*Generators, Towed bodies), (*Lighting equipment, Towed bodies), (*Towed bodies, Lighting equipment), Refueling in flight, Wind, Flight testing, Maintenance.

AD-434 061 Div. 7
OTS price $2.60

Gulton Industries Inc., Metuchen, N. J.
DESIGN, FABRICATION AND TESTING OF VENTED, RECHARGEABLE SILVER-CADMIUM CELLS.
Quarterly progress rept. no. 2, 1 Oct-30 Dec 63, by John A. Harmyk and John A. Brent, Jr. 31 Dec 63, 25p.
Contract DA36 039AMC03359E, Task 1G6 22001A053 02
Unclassified report

Descriptors: (*Batteries & components, Alkaline cells), (*Alkaline cells, Design), Silver, Cadmium, Electric currents, Capacitance, Electopotential, Tests, Dry cells.

AD-434 087 Div. 7
OTS price $2.25

Union Carbide Consumer Products, Parma, Ohio.
KRYPTON FILLED THERMIONIC COVERTER.
Summary technical rept., Jan-Dec 63, by G. G. Fee and R. Forman. Mar 64, 89p.
Contract AF33 657 10131, Proj. 8173, Task 817305 26
APL TDR64 28 Unclassified report

Descriptors: (*Thermionic converters, Diodes), (*Nuclear power plants, Diodes), Argon, Krypton, Xenon, Electric power production.

During the program 68 glass diodes containing Philips Impregnated Cathodes (operating temperature 1100 C) were tested in the core of a 5-megawatt swimming pool reactor. Gases investigated included argon krypton and xenon over the pressure range of 1 to 200 torr. In addition, interelectrode spacing, radiation dose rate and anode material were varied. Although a design goal of 5 watts had been contemplated, the maximum power generated with any of these diodes was less than 0.25 watt. Experiments werw also run with low output converters (<4microwatts) filled with radioactive krypton. Such diodes exhibited negative resistance and could be made to oscillate anywhere in the range of 50 to 10 x 10 to the 6th power cycles. These experiments were designed to study the feasibility of adapting this concept as a low power a-c generator. (Author)

AD-434 354 Div. 7
OTS price $13.50

General Electric Co., Holyoke, Mass.
HIGH POWER, HIGH VOLTAGE, AUDIO FREQUENCY TRANSFORMER DESIGN MANUAL.
Quarterly interim development rept. no. 6, 1 Oct-3 Dec 63.
1 Jan 64, 192p.
Contract NObsr87721, Proj. SR008 03 02, Task 9599
Unclassified report

Descriptors: (*Transformers, Audiofrequency), (*Handbooks, Design), (*Power, Transformers), Physical properties, Temperature, Electrical properties, Electromagnetic shielding, Copper, Coils, Manufacturing methods, Weight, Volume, Containers, Coolants, Liquids, Gases, Pressure, Stresses, Electric discharges, Dielectrics, Tables, Electric terminals, Heat exchangers, Electric wire, Naval equipment.

Six internal reports were released, and are included in this report. They are: mechanical design parameters and component selection for 105, 130 and 200 C hot spot transformer design. (Milestone 9); design parameters for insulation and cooling for 200 C and calculation formulae for winding rise (Milestone 10); measurement of distributed capacitance; electrostatic shielding; procedure for calculating copper losses (Part 2 of Milestone 7); a sample solution for determining the maximum effective area of cruciform cores. (Author)

AD-434 541 Div. 7, 8
OTS price $3.60

Sperry Microwave Electronics Co., Clearwater, Fla.
HIGH POWER FAST FERRITE SWITCHES.
Interim development rept. no. 2, 27 Sep-27 Dec 63.
Feb 64, 36p. Rept. no. SJ222 0047 2
Contract NObsr89428
Unclassified report

Descriptors: (*Ferrites, Electric switches), (*Electric switches, Ferrites), (*Electric switches, Configuration), Design, Ferromagnetic materials, Medium frequency, S-band, Geometry, C-band, Bandwidth, Resonance, Waveguides, Tests, Power supplies, Measurement, Circuits.

The SPST switching elements reported in the First Quarterly Report were evaluated at medium power levels and found to be unsatisfactory because of increased insertion loss. Experiments were performed which indicated that the increased insertion loss was caused by subsidiary resonance absorption rather than by heating effects. Investigations were then conducted to derive the optimum ferromagnetic material and waveguide geometry for the best SPST switching operation and for minimum high power effects. A 10 percent switching bandwidth has been obtained with a structure which shows no onset of subsidiary resonance effects below 150 kilowatts, and a

materials trend has been established by which it is thought that operation at 1 megawatt will be achieved. Initial investigations have been made at S-band frequencies. Very low insertion loss has been obtained at low power, but 10 percent switching bandwidth has not yet been achieved. The S-band work will continue during the next quarter concurrently with the C-band effort. Design of the electromagnetic switch configuration has begun. Initial efforts indicate that the impulse type switch should be used. Investigation of methods of reducing switching time has shown that thin-walled waveguide must be used if eddy current losses are to be reduced to an acceptable level. (Author)

AD-434 587 Div. 7
OTS price $1.60

Melpar, Inc., Falls Church, Va.
2000 F POWER WIRE FOR AEROSPACE ENVIRONMENT.
Quarterly rept. no. 4, 5 Jan-5 Apr 64.
5 Apr 64, 18p.
Contract AF33 657 11046, Proj. 8128, Task 81206
Unclassified report

Descriptors: (*Electric wire, Power), (*Performance (Engineering), Electric wire), Brazing, Electroplating, Electric discharges, Electric potential, Seals (Stoppers), Copper, Dielectric properties, Temperature, Space environmental conditions.

One of the 22-gauge power-wire systems passed the 1200-volt breakdown test at 2000 F. Quantity production of systems to meet this specification, however, has been difficult, apparently because the end seals are slightly undersized. Therefore, larger-diameter end seals will be inserted into future systems. The replacement of copper with rhodium plating on the metallizing has greatly enhanced the appearance of the braze joints. (Author)

AD-434 706 Div. 7, 20, 25
OTS price $2.25

Air Force Aero-Propulsion Lab., Aeronautical Systems Div., Wright-Patterson Air Force Base, Ohio.
WEBBED DENDRITIC SILICON SOLAR CELL RADIATION EFFECTS INVESTIGATION.
Final technical rept., 1 Jan 63-1 Jan 64,
by R. V. Babcock and K. H. Sun. 1 Jan 64, 96p.
Contract AF33 657 10527, Proj. 8173, Task 817301
APL TDR64 20 Unclassified report

Descriptors: (*Solar cells, Radiation damage), (*Radiation damage, Solar cells), (*Silicon, Solar cells), Optimization, Electron beams, Manufacturing methods, Structural properties, Metal plates, Energy conversion, Semiconductors, Oxygen, Vacuum apparatus, Vacuum furnaces, Performance (Engineering).

An investigation was conducted to determine the optimum structure for silicon solar cells, with regard to resistance to damage by 2 MeV electrons. The parameters considered were cell type, i.e. P/N or N/P, junction depth, and base resistivity. Of all the parameters affecting cell radiation resistance, the initial efficiency was found to have the largest effect. A comparison was made to assess the superiority of the optimum N/P structure, for 2 MeV electron flux densities in the range 10 to the 13th 10 to the 15th power electrons/sq cm. The degradation rate per decade of flux for the P/N structure was about 25% vs 21% for the N/P cells. (Author)

AD-434 873 Div. 7, 14
OTS price $1.60

Army Electronics Research and Development Agency, Fort Monmouth, N. J.
PERMEATION OF HYDROGEN THROUTH METALS IN THERMIONIC-CONVERTER APPLICATIONS,
by John E. Creedon. Jan 64, 19p.
Task 1G6 22001 A 055 02
AELRDL TR2431 Unclassified report

Descriptors: (*Thermionic converters, Materials), (*Thermionic emission, Metals), (*Nickel, Permeability), (*Molybdenum, Permeability), Hydrogen, High-temperature research, Anodes, Low-pressure research, Diffusion, Vacuum apparatus.

Permeation of hydrogen through the emitter surface of a thermionic converter is discussed. Approaches to eliminating a pressure buildup inside the converter are examined, and it is shown that a nickel window could be used to maintain a relatively low partial pressure of hydrogen. (Author)

AD-434 909 Div. 7, 26
OTS price $4.60

Burndy, Norwalk, Conn.
REFINEMENT & MANUFACTURE TOOL AND SPLICE FOR TELEPHONE CABLE WF-16 ( ) / U
Final rept. June 62-May 63,
by J. D. Anderson and W. L. Colwell. May 63, 47p.
Contract DA36 039SC90758
Unclassified report

Descriptors: (*Splicing tools, Electric cables), Production, Telephone lines, Crimping tools, Cutting tools, Electric insulation, Tests, Test methods, Electric wire, Dielectric properties.

The SPLICE and TOOL join two parallel pairs of Telephone Cable WF-16 ( ) /U in a single actuation of the tool The tool is relatively small in size and includes a mechanism which cuts the cable to length, strips the insulation to a given dimension, and splits the pair of conductors for insertion into the splice The completed splice has a relatively high tensile strength and affords a seal against entry of water. The crimping of the entire splice in one actuation of the tool results in eight distinct crimps being made, a wire crimp and an insulation seal crimp on each of the four conductors. With the additional requirement that this be a relatively small tool, the design was forced to concede to a high hand force in order to complete the crimp. Further, to maintain this high hand force within the capability limits of an average male adult, it was necessary to hold the mechanical characteristics of the completed splice at or near the minimum acceptable level. The tensile strength and sealing effectiveness could be increased by crimping deeper, but a deeper crimp would require more hand force (Author)

AD-435 008 Div. 7
OTS price $2.60

Eagle-Picher Co., Joplin, Mo.
RESEARCH ON AMMONIA BATTERY SYSTEM.
Quarterly progress rept. no. 2, 1 Oct-31 Dec 63,
by D. J. Doan and L. R. Wood. 31 Jan 64, 22p.
Rept. no. 14
Contracts DA36 039AMC02173E, DA36 039sc89188,
DA Proj. 1G6 22001A053 02
Unclassified report

Descriptors: (*Batteries and components, Electrolytes), (*Ammonia, Batteries and components), Solvents, Liquefied gases, Performance (Engineering), Cathodes (Electrolytic cell), Anodes (Electrolytic cell), Design.

Fractional factorial studies regarding improved cell design have resulted in isolation of main effect factors and work is being continued toward wider and more complete evaluation. Data obtained from these studies and from miscellaneous single cell work have resulted in design improvements which have significantly increased cell efficiency and reliability. These cell improvements have not been as yet incorporated into battery design to check effect on performance. (Author)

AD-435 031 Div. 7
OTS price $1.60

ITT Surprenant Mfg. Co., Clinton, Mass.
DEVELOPMENT AND CONSTRUCTION OF WATERTIGHT COAXIAL CABLES RG 11/AU - RG 217/U - RG 218/U.
Final engineering rept.
16 Mar 64, 12p.
Contract NObsr87574, Proj. SR008 80 303, Task 9634

Unclassified report

Descriptors: (*Coaxial cables, Production), Naval equipment, Moistureproofing, Pressure, Dielectrics, Underwater equipment, Polyester plastics, Physical properties, Mechanical properties, Halocarbon plastics, Temperature.

This report contains technical and factual data concerning the development and testing procedures used in an effort to produce three watertight coaxial cables (RG 11A/U - RG 217/U - RG 218/U). Discussed are the final procedures and test methods used. Included are recommendations to be considered in the future development of cables of this general type. (Author)

8. ELECTRONICS AND ELECTRONIC EQUIPMENT

AD-433 489 Div. 8
OTS price $4.60

Electronic Defense Lab., Mountain View, Calif.
EXPERIMENTAL RESULTS CONCERNING THE CONICAL SCANNING ERROR SIGNAL OF A BROAD-BAND ANTENNA SYSTEM,
by Harold F. Rearick. 5 Dec 63, 44p. Rept. no. TM M442
Contract DA36 039sc87499
Unclassified report

Descriptors: (*Antennas, Tracking), (*Tracking, Antennas), (*Scanning, Errors), (*Errors, Scanning), Broadband, Phase detectors, Polarization, Horn antennas, Reflectors, Modulation, Targets, Harmonic analysis, Measuring devices (Electrical & electronic).

A description of the error signal created by conical scanning was experimentally obtained for a passive tracking antenna system designed to operate from 1.5 Gc to 12 Gc. The information obtained consisted of the error signal fundamental null position, the error signal fundamental gradient, the amplitudes of the harmonic components of the error signal and the phase of the error signal fundamental as functions of target error angle, target position angle, received frequency and polarization. (Author)

AD-433 496 Div. 8, 26
OTS price $2.60

Texas Instruments Inc., Dallas.
PRODUCTION ENGINEERING MEASURES TO INCREASE TRANSISTOR RELIABILITY.
Quarterly progress rept. no. 4, 1 Apr-30 Jun 63,
by Dale Bennett, Edmond McGhee, Herbert Locke, Milton Mack and Clarence Muncil. 30 Jun 63,
28p. Rept. no. 03 64 16
Contract DA36 039sc86730
Unclassified report

Descriptors: (*Transistors, Production), Silicon, Scheduling, Tables, Fixed contacts, Encapsulation, Diffusion, Photoengraving, Temperature, Cleaning, Gold, Aluminum, Seals (Stoppers).

The process improvement work on the 2N656 device has been completed. Thermal resistance measurements indicate a power dissipation capability of 15 watts at 100 C case temperature. The Planar device improvements include 'hard' gold alloy wafer mounting, ultrasonically cold-bonded contacts, and an improved slug package. Varnishes and organics have been completely eliminated from the inside of the package. Purity of the encapsulated atmosphere is assured by a through cleaning and baking of all parts and by rigid control of the assembly and canning dry-box atmosphere. The aluminum wafer contacts are never exposed to etchants. Corrosive chemicals have been eliminated from the assembly process. Improved processes in the diffusion, photo resist, etch, evaporation and plating areas have contributed to significantly increased product yields, quality and uniformity. These process improvements have not only upgraded the 2N656, but also made possible the EIA reservation of a new device series, 2N2987 to 2N2994 - rated at 25 nanoamperes maximum 1 sub CEX at 150% of rated BV sub CEO. Saturation properties and current-carrying capabilities have been sufficiently improved such that V sub BE and V sub CE(sat) are specified at a collector current of 500 milliamperes as compared to the 200 milliampere rating of the Mesa 2N656. (Author)

AD-433 531 Div. 8
OTS price $1.60

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
STATISTICAL EVALUATION OF THE BEAM DISPLACEMENT IN A SYSTEM OF RADIATORS,
by O. G. Vendik. 20 Jan 64, 16p.
FTD TT63 1079 Unclassified report

Trans. from Radiotekhnika I Elektronika, 8:7, pp. 1130-1138, 1963.

Descriptors: (*Antennas, Statistical analysis), Antenna radiation patterns, Beams (Electromagnetic), Electric currents, Probability, Phase measurement.

For an antenna in form of a system of radiators (emitters) the relative RMS dispersal, characterizing the angular accuracy of beam position is calculated. The calculation is made in dependence upon the RMS dispersals of amplitudes and phases of currants in individual emitters. The obtained results are true for systems, assuring maximum directivity coefficient of action in given direction and having sufficiently low mutual relationship between the emitters, and can be used for systems of arbitrary emitters with arbitrary structure of their mutual disposition. (Author)

AD-433 541 Div. 8
OTS price $1.10

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
INTERNAL OSCILLATIONS IN P-N-P-M TRANSISTORS,
by N. A. Shekhotsov, E. D. Prokhorov and B. V. Safronov. 19 Feb 64, 9p.
FTD TT64 68 Unclassified report

Trans. from Radiotekhnika i Elektronika 8:10, pp. 1783-1786, 1963.

Descriptors: (*Transistors, Oscillation), Gain, Electric currents, Direct current, Electrons.

It is shown that the complex dependence of the coefficient of amplification in accordance with the current alpha of transistors of the type p-n-p-m is to be explained by the occurrence of inner oscillations. There are presented some results of experimental investigation of the internal oscillations and the proposed mechanism of their formation. (Author)

AD-433 588 Div. 8, 25
OTS price $1.10

Research Lab of Electronics, Mass. Inst. of Tech., Cambridge.
HIGH DENSITY PLASMA PHYSICS.
Final rept., 1 Oct 59-31 Oct 63,
by Sanborn C. Brown. 31 Jan 64, 4p.
Contract AF19 604 5992, Proj. 5634, Task 563402
AFCRL 64 68 Unclassified report

Descriptors: (*Plasma physics, Air Force research), Magnetic fields, Electrons, Ions, Microwaves, Bremsstrahlung, Electron density.

AD-433 597 Div. 8
OTS price $1.10

Air Force Cambridge Research Labs., Bedford, Mass.
THE DIFFRACTION THEORY OF LARGE APERTURE SPHERICAL REFLECTOR ANTENNAS,
by A. C. Schell. Nov 63, 8p.
Proj. 4600
AFCRL 63 545 Unclassified report

Reprint from IEEE Transactions on Antennas and Propagation, AP-11:4, pp. 428-432, July 63. (Copies also available from DDC)

Descriptors: (*Antennas, Diffraction), Antenna radiation patterns, Antenna feeds, Electromagnetic wave reflections, Reflectors, Scanning, Distortion, Electron lenses, Electromagnetic fields.

The field along the axis of a spherical reflector is determined from the geometry of the system rather than from each term of the aberration taken separately. The procedure shows how the field distribution changes from the case of small aberration, where there is a well-defined focus, to the geometric optics limit. A spherical reflector becomes an efficient antenna when a set of feed elements is located along the axis to reduce the effects of spherical aberration. The number and position of these elements is dictated by the size and curvature of the reflector and the allowable distortion of the wavefront. (Author)

AD-433 605 Div. 8
OTS price $1.10

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
DEVICE FOR THE CALIBRATION OF MEASURING MICROPHONES.
3 Mar 64, 3p.
FTD TT64 3 Unclassified report

Trans. from Ustanovka Dlya Graduirovki Izmeritel'nykh Mikrofonov, Komitet Standartov, Mer i Izmeritel'nykh Priborov Pri Sovete Ministrov SSSR, Moskva 1960.

Descriptors: (*Microphones, Calibration), (*Calibration, Microphones), Test equipment, Electroacoustic transducers, Theory, Measurement.

AD-433 614 Div. 8, 30
OTS price $3.60

Aerospace Corp., Los Angeles, Calif.
BIBLIOGRAPHY ON THE USE OF REDUNDANCY AS A MEANS OF IMPROVING RELIABILITY,
by J. G. Mead and R. J. Thompson. 15 Jan 64, 34p. Rept. no. TDR269 4303 6
Contract AF04 695 269
SSD TDR63 375 Unclassified report

Descriptors: (*Bibliographies, Reliability (Electronics)), (*Reliability (Electronics), Bibliographies), Electronic equipment, Redundant components, Digital systems, Computers, Quality control.

AD-433 621 Div. 8
OTS price $3.60

Space Sciences Lab., General Electric Co., Philadelphia, Pa.
PERFORMANCE EVALUATION OF TRAP IMAGE ORTHICON SYSTEM,
by R. L. Gulsati. 21 Dec 63, 35p. Rept. no. R63SD1042
Contract AF04 694 222
Unclassified report

Descriptors: (*Camera tubes, Guided missile tracking system), Reentry vehicles, Television cameras, Display systems, Radiometers, Model tests, Performance (Engineering), Resolution, Sensitivity.

AD-433 623 Div. 8
OTS price $2.60

Rensselaer Polytechnic Inst., Troy, N. Y.
INVESTIGATION OF TRANSIENT RADIATION DAMAGE IN SEMICONDUCTOR MATERIALS.
Quarterly progress rept. no. 3, 1 Aug-31 Oct 63, by Roland M. Lichtenstein. 31 Oct 63, 21p.
Contract DA36 039AMC02165E, Task OST59 74 01 004 36 00DASA
Unclassified report

Descriptors: (*Semiconductors, Radiation damage), (*Radiation damage, Semiconductors), Silicon, X-rays, Electrical conductance, Life expectancy, Measurement.

A high-frequency technique was developed for the measurement of bulk carrier lifetime in silicon samples. The use of contacts was eliminated. The technique is based on the measurement of the Q-value of a tank circuit which contains the sample. A single tube (6J6) is used to generate the oscillations and to measure transient changes of the Q-value. (Author)

AD-433 630 Div. 8, 25
OTS price $2.60

Smyth Research Associates, San Diego, Calif.
A STUDY OF ''PROPAGATION MEDIUM RF NOISE''.
Interim engineering rept. no. 3, Jan-Mar 64. Mar 64, 29p. Rept. no. 384
Contract AF33 657 11661
Unclassified report

Descriptors: (*Noise (Radio), Radio signals), Angle of arrival, Multipath transmission, Wave transmission, Phase modulation, Amplitude modulation, Ionospheric propagation, Troposphere.

The effects of the propagation medium noise upon long distance, line-of-sight, tropospheric microwave circuits are examined. The propagation medium noise modulates the phase, amplitude, and angle of arrival of the signal. Based upon the limited amount of experimental data available, it is concluded that the phase noise (time frequency noise) will not be serious in the case of transmissions between fixed terminals if the video bandwidth is properly chosen. In particular, frequency components of less than 0.1 cps should be excluded by the video filter. The angle of arrival noise (space frequency noise) may become serious if fixed antennas with beamwidths of less than one degree are used. The amplitude modulation, which is apparently due to some sort of atmospherically modified multipath situation, lead to 25 db fades for a period of time which will be important for high reliability circuits. When one or both of the terminals are moving, the effects of the propagation medium noise should be considerably more serious. Experimental data for this case is extremely limited and numerical estimates are therefore very tentative. (Author)

Division 8 - ELECTRONICS AND ELECTRONIC EQUIPMENT

AD-433 654 Div. 8
OTS price $14.00

Lansdale Div., Philco Corp., Pa.
PEM FOR TRANSISTOR MANUFACTURING PROCESS IMPROVEMENT.
Final progress rept., 30 Apr 62-31 Dec 63, by J. G. Sanders. 31 Dec 63, 210p.
Contract DA36 039sc86720, Philco proj. R232
Unclassified report

Descriptors: (*Transistors, Manufacturing methods), (*Specifications, Processing), Germanium, Electrodes, Nickel, Tin alloys, Zinc alloys, Gallium alloys, Heat resistant metals and alloys, Degasification, Encapsulation, Emissivity, Coatings, Mass spectroscopy, Test methods, Life expectancy, Quality control.

The work for reliability improvement of the jet etch type transistor through process improvements is complete. The report includes the over-all processing specification for the improved transistor, and the applicable Inspection and Quality Control Plan. Data are given on the final test lot of the improved device and indicate the Lot Acceptance Test was passed. The method devised for accelerated testing and extrapolation of reliability levels under use conditions was effectively demonstrated. Accumulated data on transistors produced using the improved processes show that an acceleration curve having a slope equivalent to an activation energy of 19.6 Kcal/mole is realistic for the improved device. Thermal resistance measurement studies showed that the d-c beta method of test with voltage compensation gives results that are reproducible and closely approach the values of effective thermal resistance determined from operating and storage life tests. The maximum operating rating of the improved transistor is reported as 150 mw at 25 C at a lambda = 0.7%. (Author)

AD-433 657 Div. 8
OTS price $10.10

Airton, Inc., Morris Plains, N. J.
DEVELOPMENT OF A FERRITE MATERIAL FOR A HIGH-POWER PHASE SHIFTER AT S-BAND.
Final rept., 18 Apr 62-15 Jan 64.
15 Jan 64, 123p.
Contract NObsr87388
Unclassified report

Descriptors: (*Ferrites, Synthesis (Chemistry)), (*Phase shifters, S band), Manufacturing methods, Material forming, Physical properties, Electrical properties, Dielectric properties, Magnetic properties, Spinels, Oxides, Iron compounds, Nickel compounds, Aluminum compounds, Gallium compounds, Manganese compounds, X-ray diffraction analysis, Flame spraying, Sintering.

This report includes the data obtained on gallium and aluminum substituted nickel ferrite. The material which seemed best capable for use in a phase shifter had a total aluminum plus gallium substitution of 0.975 moles. The composition was $Ni.98Mn.02Ga.30Al.67Fe_{1.025}O_4$. This material had a Curie temperature of 200 C, a 20 Mc tan delta of approximately 0.003, a saturation magnetization of approximately 970 gauss, and a chi'' at resonance of approximately 4.0 at 930 gauss. This material when hot pressed did not show any decrease in relative susceptability at power levels as high as 2000 KW, whereas magnesium manganese ferrite showed non-linear effects at a power level of 20 KW. (Author)

AD-433 697 Div. 8
OTS price $8.60

Aero Geo. Astro Corp., Alexandria, Va.
SUPERSENSITIVE CRYSTAL VIDEO TRANSPONDER SET AN/DPN-(XE-1).
Quarterly progress rept. no 2, by Charles R. Wise. Jan 64, 91p.
Contract DA36 039AMC03190E
Unclassified report

Descriptors: (*Transponders, C-band), (*C-band Transponders), Radar tracking, Ground Support equipment, Radar receivers, Radar beacons, Video amplifiers, Radar transmitters, Power supplies, Reliability (Electronics), Electrical properties, Transistors, Performance (Engineering), Gain, Power, Signal-to-noise ratio, Tunnel diodes, Miniature electronic equipment, Crystals, Instrumentation.

The AN/DPN-(XE-1) Transponder will be a miniature, supersensitive crystal video transponder for operation at C-band with ground-based instrumentation type radars. It will extend the range for tracking of missiles, drones, and satellites to 300 miles. (Author)

AD-433 698 Div. 8, 15, 30
OTS price $8.60

Cruft Lab., Harvard U., Cambridge, Mass.
A LOCK-ON PROBABILITY ANALYSIS FOR THE INITIAL SYNCHRONIZATION OF PHASE-LOCKED LOOPS,
by Robert J. McLaughlin. 3 Feb 63, 95p. Technical rept. 372
Contract Nonr1866 16, Proj. NR372 012
Unclassified report

Descriptors: (*Phase-locked communication systems, Synchronization (Electronics)), (*Oscillators, Control systems), (*Control systems, Probability), Circuits, Communication theory, Errors, Frequency analyzers, Networks, Noise, Time, Statistical analysis, Statistical functions, Differential equations, Perturbation theory.

This report presents a general method for the calculation of the lock-on time as a function of the initial phase (angular) error and initial frequency (angular velocity) error, in the absence of noise, with particular reference to the specially-important phase-locked-loop characterized by a nonlinear differential equation. As a result of the presence of saddle-points in the phase-space of the differential equations of phase-locked loops, it is shown that for any value of the initial frequency error, the lock-on time will be indefinitely large for a value of the initial phase error sufficiently close to a saddle-point separatrix, and that the lock-on time varies as the negative logarithm of the distance of the initial point from the separatrix when this distance is sufficiently small. An explicit formula is given for the equation for the phase-locked-loop. (Author)

AD-433 702 Div. 8
OTS price $1.60

Army Electronics Research and Development Agency, Fort Monmouth, N. J.
SHORT-PULSE MODULATOR,
by Robert Combs. Nov 63, 12p.
Task 1G6 22001A055 04
AELRDL RT 2414
Unclassified report

Descriptors: (*Modulators, Design), Thyratrons, Magnetrons, Wiring diagrams, Portable, Pulse generators.

This program involves the construction of a 20-nanosecond modulator that will pulse a magnetron at a pulse reptition frequency of 15 kilocycles with an input power of 20 kilovolts at 20 peak amperes. The modulator is a hard-tube version which utilizes an E37B thyratron in the driver circuit to permit the use of high repetition rates. This, together with a length of RG8/U cable (as a pulse-forming network), develops a 20-nanosecond pulse width. The pulse is then amplified by the hard tubes and is capacitively coupled to the magnetron. (Author)

AD-433 704 Div. 8, 26
OTS price $5.60

Eitel-McCullough Inc., San Carlos, Calif.
HIGH POWER X-BAND GENERATOR.
Quarterly rept. no. 3, 1 Apr-30 June 63,
by William R. Luebke, Jared Leidigh, Siegfried Vogel and Tore Wessel-Berg. 26 July 63, 56p.
Contract AF30 602 2756, Proj. 5573, Task 557303
RADC TDR63 361 Unclassified report

Descriptors: (*Microwave amplifiers, Klystrons), (*Klystrons, Production), (*Production, Microwave amplifiers), (*X-band, Microwave amplifiers), Electron guns, Measuring devices (Electrical & Electronic), Power supplies, Modulators, Manufacturing methods, Performance (Engineering), Electrical properties, Configuration, Cavity resonators, Waveguides.

Development of a klystron amplifier operating at 8 kMc and delivering one megawatt of CW power is presented. Assembly and testing of the high-power beam testers are described. Test results were more than adequate to meet the first phase goals of the program. A pulsed rf vehicle for evaluation of extended-interaction output cavities is nearly complete. A portion of a theoretical analysis of extended-interaction structures is given. (Author)

AD-433 705 Div. 8
OTS price $5.60

Georgia Inst. of Tech. Engineering Experiment Station, Atlanta.
ELECTRONIC EQUIPMENT INTERFERENCE CHARACTERISTICS-COMMUNICATION TYPE.
Quarterly rept. no. 3, 15 Aug-15 Nov 63,
by C. W. Stuckey, E. W. Wood, R. D. Trammell, Jr., E. E. Donaldson, Jr. and O. H. Ogburn. 15 Nov 63, 56p. Rept. no. 24
Contract DA36 039AMC02294E, Proj. 3B24 01 001
Unclassified report

Descriptors: (*Pulse communication systems, Radio interference), Frequency modulation, Speech transmission, Intelligibility, Multi path transmission, Radio communication systems, Interference.

The effects of multipath interference on the intelligibility of speech transmitted over an FM system employing time division multiplexing are reported. Predicted intelligibility measurements based on audio output S/N ratios indicate that significant degradation in intelligibility will exist for the FM/TDM system tested when multipath signals of equal strength are received over paths which differ in length by as little as 0.15 mile. The probability of significant multipath interference in FM systems which use TDM is expected to be greater than that for ordinary wide-band FM systems. The accuracy of mixer spurious response level prediction is demonstrated for variations in mixer operating and drive conditions. Utilization of the prediction technique in the design of mixers is discussed. Several significant facts concerning the design of radio receiving equipments as illuminated by the mixer studies are presented for future guidance. (Author)

AD-433 708 Div. 8, 26
OTS price $1.60

Knights, James Co., Sandwich, Ill.
HIGH PRECISION MINIATURE CRYSTAL UNITS 4.3 TO 20 MC.
Progress rept. no. 7, 1 Apr-30 June 63.
30 June 63, 17p.
Contract DA36 039SC75974
Unclassified report

Descriptors: (*Crystals, Superhigh frequency), (*Superhigh frequency, Crystals), Manufacturing methods, Crystals), Production, Performance (Engineering), Nickel, Electroplating, Temperature.

Production of crystal units in the 4.3 to 20 mc range in HC-18/U holders, to a tolerance of + 0.0025% from nominal over the temperature range -55 to +105 C is discussed, with emphasis upon angular vs calibration tolerances. (Author)

AD-433 710 Div. 8
OTS price $2.60

Motorola Inc., Phoenix, Ariz.
PRODUCTION DEVELOPMENT OF A SILICON PLANAR EPITAXIAL TRANSISTOR WITH A MAXIMUM OPERATING FAILURE RATE OF 0.001% PER 1000 HOURS AT A CONFIDENCE LEVEL OF 90% AT 25 C.
Quarterly rept. no. 5, 1 May-31 Jul 63,
by Paul Greer. 31 Jul 63, 22p.
Contract DA36 039sc86728
Unclassified report

Descriptors: (*Transistors, Epitaxial growth), Silicon, Manufacturing methods, Production, Power, Life expectancy, Environmental tests, Aluminum, Gold, Aluminum coatings, Electric potential.

Efforts continued on a program to improve production techniques for the type 2N696 silicon epitaxial transistor. The power step-stress, operating life, and environmental testing of the Al-Al-Au metallization process are covered and the results compared with the older metallization processes. An acceleration factor was determined between step-stress levels and the level for which the .001%/1000 hours objective was established. (Author)

AD-433 711 Div. 8, 26
OTS price $6.60

Signetics Corp., Sunnyvale, Calif.
FUNCTIONAL CIRCUIT UNITS.
Quarterly progress rept. no. 1, 1 Aug-30 Oct 63.
by E. Aoki, O. Baker, J. Fulton, D. McKenzie and B. Meyer. 14 Nov 63, 70p.
Contract DA36 039AMC03269E
Unclassified report

Descriptors: (*Switching circuits, Microminiaturization (Electronics)), (*Microminiaturization (Electronics), Switching circuits), (*Production, Switching circuits), Computer logic, Resistors, Capacitors, Transistors, Performance (Engineering), Metal films, Diodes (Semiconductor), Electrical properties, Diffusion, Molecular electronics, Epitaxial growth.

A series of NAND gates were constructed using triple diffusion processes with promising results. Evaluation and analysis of several binary circuits is actively under way. In all cases, the design, evaluation, and analysis is being conducted with worst cases in mind and with overall system performance as a primary consideration. (Author)

AD-433 720 Div. 8, 26
OTS price $3.60

General Electric Co., Syracuse, N. Y.
PRODUCTION ENGINEERING MEASURE ON HIGH PERVEANCE CATHODE-RAY TUBES.
Quarterly progress rept. no. 9, 9 June-8 Sep 63.
by Edward T. Rate. 8 Sep 63, 31p.
Contract DA36 039SC85965
Unclassified report

Descriptors: (*Cathode ray tubes, Production), Manufacturing methods, Electron guns, Mechanical drawings, Specifications, Electrodes.

In the absence of firm technical specifications, all device construction has been halted. No firm contract completion schedule can be made until the revised specifications are complete and approved. Efforts this quarter were limited to proving out production tooling, preparing testing equipment for the production phase of the contract, and obtaining light-output and life-test minimum-hours requirements. (Author)

AD-433 725 Div. 8, 14
OTS price $5.60

HP Associates, Palo Alto, Calif.
SEMICONDUCTOR MATERIALS.
Interim engineering rept. no. 2, 27 Sep-26 Dec 63.
26 Dec 63, 56p.
Contract NObsr89489, Proj. SR008 0301, Task 9475
Unclassified report

Descriptors: (*Diodes (Semiconductor), Production), (*Production, Diodes (Semiconductor)), (*Electroluminescence, Display systems), (*Display systems, Diodes (Semiconductor)), Arsenic alloys, Manufacturing methods, Gallium alloys, Semiconducting films, Lasers, Crystal growth, Configuration, Electrical properties, Spectroscopy.

Preliminary tests on integrated GaAs and GaAs-GaP el diode arrays are reported. Work on material synthesis and structural investigation of boron phosphides was completed. Progress on material and device technology using GaAs-GaP alloy el diodes is described. Measurements of spectral distribution, absolute luminance and quantum yields are reported. Diodes fabricated from an alloy of 58% GaAs and 42% GaP produce 25-30 footlamberts with external photon/electron yield of 10 to the minus 5 power. This is obtained by applied voltages of less than 5v. (Author)

AD-433 773 Div. 8, 26
OTS price $6.60

Western Electric Co., Laureldale, Pa.
PRODUCTION ENGINEERING MEASURE. MECHANIZATION OF SEMICONDUCTOR DEVICES, 2N560, 2N1051, 2N1072, 2N1195, 1N664, 1N665, 1N666, 1N667, 1N668, 1N669, 1N673, 1N675, 1N697 AND 1N701.
Quarterly progress rept. no. 17, 1 Oct-31 Dec 63.
by M. N. Reppert. 31 Dec 63, 66p.
Contract DA36 039sc81294
Unclassified report

Descriptors: (*Semiconductor devices, Manufacturing methods), (*Transistors, Manufacturing methods), (*Diodes (Semiconductors), Manufacturing methods), Production, Difussion, Welding, Metals, Plating, Phosphorus, Machines, Industrial equipment, Soldering.

On the transistor part of the program, improvements were effected at the diffusion, the tip welding, and lead trimming operations. On the diode part of the program, like improvements were made at lead straightening and racking, slice diffusion, and slice plating. A summary is given of the progress made. (Author)

AD-433 791 Div. 8, 14
OTS price $8.10

Varian Associates, Palo Alto, Calif.
HIGH POWER R-F WINDOW STUDY PROGRAM.
Final technical rept.,
by Floyd Johnson. Nov 63, 90p. Rept. no. 304 1F
Contract AF30 602 2844, Proj. 5573, Task 557 303
RADC TDR63 510 Unclassified report

Descriptors: (*Waveguide windows, Scientific research), Beryllium compounds, Aluminum compounds, Oxides, Radiofrequency power, Quartz, Saphires, Temperature, Liquid cooled, Nitrogen, Klystrons, Seals (Stoppers), X-band.

The purpose of the work undertaken by this study program was to pursue theoretical and experimental investigations leading to the development, fabrication and testing of windows with bandwidths up to 25% and capable of transmitting 250 kilowatts cw, X-band power. Considerations of bandwidth and power requirements limited fabrication of test models to windows using single and double discs and self resonant block windows. The program requirements were more than satisfied by the high power testing to 275 kilowatts of a single crystal sapphire disc windown. In all, three different sapphire windows were tested without window failure to powers of 250 kilowatts or more. (Author)

AD-433 797 Div. 8
OTS price $3.60

Electronic Communications Inc., Timonium, Md.
DIODE, MILLIMETER WAVE TYPE MIXER (3.2 MM).
Quarterly progress rept. no. 2, 1 Sep-30 Nov 63,
by R. J. Bauer and J. W. Dozier. 30 Dec 63, 40p.
Contract DA36 039AMC02347E, Proj. 1G622001A056
Unclassified report

Descriptors: (*Mixers (Electronic), Diodes (Semiconductors)), (*Tunnel diodes, Mixers (Electronic)), (*Millimeter waves, Mixers (Electronic)), Klystrons, Electric impedance, Noise (Radio), Electroforming, Waveguides, Eutectics, Bonding, Germanium, Gallium alloys, Arsenic alloys, Silicon, Bronze, Phosphorus alloys, Soldering, Electrolytic polishing, Zinc, Aluminum, Tungsten, Radiofrequency power, Extremely high frequency.

A brief description is presented on the problems encountered with RF impedance measurement equipment and klystrons. Results are described on the conversion loss, crystal noise ratio and RF impedance of gallium arsenide - phosphor bronze diodes in an electroformed wave-guide mixer mount. A method is presented for observing the RF rectification characteristic of a diode while it is being formed. Data on variable waveguide shorts is compared which results in a finalized selection for future experimental mixers. Eutectic bonding and solder mounting of germanium, gallium arsenide and silicon to metal support posts are described. (Author)

AD-433 798 Div. 8
OTS price $3.60

Airborne Instruments Lab. Inc., Deer Park, N. Y.
FREQUENCY MULTIPLIER.
Quarterly progress rept. no. 2, 1 Oct-31 Dec 63.
by J. J. Taub, G. P. Kurpis and J. W. Lyons.
31 Dec 63, 36p.
Contract DA36 039AMC03196, Proj. 3A99 15 004
Unclassified report

Descriptors: (*Frequency multipliers, X-band), Transistors, Oscillators, Bandpass filters, Transistor amplifiers, Varactor diodes, Measurement.

The X-band source described in detail in this report consists of a transistor oscillator, transistor quadrupler, filter, transistor sextupler, filter, transistor tripler, transistor power amplifier, and two varactor quintuplers. The multiplier chain is of modular construction for ease of testing and troubleshooting. The results of optimizing each unit in the multiplier chain are given, as well as data on the individual units. Experimental results on the 10.65 to 21.3 Gc doubler and the 25 to 50 Gc doubler are also given. (Author)

AD-433 805 Div. 8, 26
OTS price $3.60

Mallory, P. R., and Co., Indianapolis, Ind.
PRODUCTION ENGINEERING MEASURE FOR IMPROVED RELIABILITY OF SOLID ELECTROLYTE TANTALUM CAPACITORS.
Quarterly rept. no. 2, 30 Sep-29 Dec 63,
by A. W. H. Smith. 29 Dec 63, 36p.
Contract DA36 039AMC03623E
Unclassified report

Descriptors: (*Tantalum capacitors, Manufacturing methods), Electrolytes, Tantalum, Powders, Electric potential, Test methods, Tests, Production, Cathodes, Anodes.

Detailed analysis of the incoming evaluation procedure for tantalum powder was continued. An apparent anomaly in the breakdown voltage test results has become apparent. At the present time, no experimental evidence is available which can throw doubt on the test procedure. A procedure for electrical evaluation of tantalum wire was worked out. Studies of anode fabrication and capacitor assembly were initiated. Wide variances in the in-process breakdown voltage tests was observed. Some specifications were revised in view of the results of dehydration studies and data analysis on the first pilot run samples. (Author)

AD-433 812 Div. 8, 26
OTS price $3.60

Western Electric Co., Laureldale, Pa.
PRODUCTION ENGINEERING MEASURE. MECHANIZATION OF SEMICONDUCTOR DEVICES 2N559-2N1094.
Quarterly progress rept. no. 24, 1 Oct-31 Dec 63,
by M. N. Reppert. 31 Dec 63, 40p.
Contract DA36 039sc72729
Unclassified report

Descriptors: (*Transistors, Production), (*Production, Manufacturing methods), (*Manufacturing methods, Transistors), (*Automation, Production), Bonding, Electric wire, Semiconducting films, Welding, Diffusion, Silicon, Oxides, Electrical properties, Machines, Reliability (Electronics).

Improvements were made to the diffusion and the stripe evaporation and alloying operations. Refinement of mechanized operations continued. Refinement of piece part cleaning, was completed with the addition of improved loading stations on two machines. The most extensive changes pending on the other operations involve addition of subassembly loading mechanisms to the Header Assembling and the Strip Perforating and Welding machines. Development of material handling system refinements is also scheduled to continue. While designing a load-unload mechanism for ''Slide-Pac'' header trays, another tray design was proposed. Improved header handling techniques were developed for application between heater plating and wafer bonding. In the proposed approach, the steel strip used to support the headers during plating will be utilized until the headers are loaded into trays for wafer bonding. (Author)

AD-433 816 Div. 8
OTS price $11.00

Magnavox Co., Fort Wayne, Ind.
QUARTZ CRYSTAL OSCILLATOR CIRCUITS STUDY.
Rept. no. 3, 1 Mar-30 Sep 63,
by D. Firth. 10 Mar 64, 150p. Rept. no. TP63 994
Contract DA36 039AMC00043E, Proj. 3A99 15 004
Unclassified report

Descriptors: (*Crystal oscillators, Quartz resonators), (*Quartz resonators, Crystal oscillators), (*Handbooks, Crystal oscillators), Transistors, Very high frequency, High frequency, Medium frequency, Low frequency, Very low frequency, Design, Communication equipment, Transistor amplifiers, Feedback amplifiers, Electric potential, Gain, Electrical impedance.

The purpose of this program is to compile a quartz crystal oscillator design handbook applicable in the frequency range of 1 KC to 200 MC. The objective of the handbook is to facilitate and systematize the design the quartz crystal oscillators to eliminate crystal misapplications, reduce design time and costs, and increase the reliability of operation. The handbook will not be directed at the design of ultra-stable crystal oscillators, but rather at the non-temperature controlled, medium stability crystal oscillator prevalent in many types of communications equipment. A design procedure is presented for two type of Pierce transistor oscillators in the 0.8 to 20 MC range. The first of these is a derivative of the basic Pierce circuit which, at the cost of a slight increase in circuit complexity, is capable of an increase output power relative to that of the basic circuit. This type of oscillator is considered useful for transmitter-driver applications. The second type is the basic Pierce circuit which will be useful in low power level applications such as the local oscillator in small signal mixing operations. (Author)

AD-433 841 Div. 8
OTS price $1.60

American Machine and Foundry Co., Stanford, Conn.
30 FOOT LIGHTWEIGHT TELESCOPIC MAST, PHASE II.
Quarterly rept. no. 2, 1 Oct 63-31 Jan 64,
by Lewis V. Smith. 31 Jan 64, 11p. Rept. no. SCL4549
Contract DA36 039AMC03309E, Proj. 3B24 01 003
Unclassified report

Descriptors: (*Antenna masts, Performance (Engineering), Weight, Vibration, Wind, Military requirements, Aluminum.

The preliminary engineering test model of a 30 foot lightweight telescopic mast was built and partially tested. Several improvements to the design were incorporated. The model passed the 200 cycle test and the 70 mph static wind load test. (Author)

AD-433 860 Div. 8
OTS price $4.60

Raytheon Co., Newton, Mass.
RESEARCH AND DEVELOPMENT ON TRAVELING IMAGE STORAGE TUBE.
Interim engineering rept. no. 1, 1 Aug 63-15 Feb 64,
by Gordon R. Spencer. Mar 64, 42p.
Contract AF33 616 11674
Unclassified report

Descriptors: (*Cathode ray tubes, Airborne), (*Display systems, Cathode ray tubes), Real time, Cathode ray tube screens, Storage tubes, Spaceborne, Traveling-wave tubes, Scanning.

A display device is discussed for use in aircraft and space vehicles, which will provide a continuously-moving, two-dimensional image, generated from information obtained from a line-scan sensor in combination with the forward motion of the vehicle. The feasibility is being investigated of a cathode-ray device employing the following principles and features: (1) Tenebrescent (dark-trace) writing and storage; (2) viewing by ambient, reflected light; (3) a continuously-moving, variable speed, endless belt target within the tube; and (4) positive, direct mechanical motion coupling through the vacuum envelope. (Author)

AD-433 891 Div. 8
OTS price $5.60

Xerox Corp., Rochester, N. Y.
LOW-COST MICROCIRCUITS FOR MICROASSEMBLIES.
Quarterly rept. no. 2, 1 Oct 63-1 Jan 64,
by C. Mytych. 1 Jan 64, 55p.
Contract DA36 039AMC03257E
Unclassified report

Descriptors: (*Microminiaturization (Electronics), Manufacturing methods), (*Fixed resistors, Microminiaturization (Electronics)), (*Fixed capacitors, Microminiaturization (Electronics)), Photo engraving, Vapor plating, Vacuum apparatus, Environmental tests, Printed circuits, Modules (Electronic), Metal coatings, Copper, Chromium, Chemical milling, Metal films.

An approach to low-cost resistor and capacitor elements utilizing the microelement wafer concept and the double-etch process is under investigation. Multi-layered films were placed on ceramic substrates by vacumm and electroless deposition techniques to form microelement wafers. The multi-layered films are converted to resistor and capacitor elements by subtractive methods, utilizing xerographic stenciling and selective etching. Data covering T.C.R., temperature cycling, load life stability and yield for resistor elements is presented. The capacitor and micromodule assembly programs are outlined. (Author)

AD-433 900 Div. 8
OTS price $4.60

Microwave Associates, Inc., Burlington, Mass.
MILLIMETER WAVE COMPONENT DEVELOPMENT (BEAM-PLASMA AMPLIFIER).
Technical note no. 3, 21 Aug-20 Nov 63,
by Paul Chorney and Richard J. Madore. Feb 64, 41p.
Contract AF30 602 2948, Proj. 5573, Task 557301
RADC TDR64 19 Unclassified report

Descriptors: (*Microwave amplifiers, Plasma physics), (*Plasma physics, Microwave amplifiers), Electrical properties, Performance (Engineering), Electric current, Measuring devices (Electrical & electronic), Waveguides, Mechanical properties, Standing wave ratios, Waveguide windows, Waveguide filters.

Plasma density measurements were performed on a third plasma tester. A method for operating the plasma discharge on a pulsed basis is described which allows the running of high discharge currents without damage to the probe. Radial density profiles were measured which indicate that radial diffusion may be appreciable. Profile measurements and density measurements were performed with the tube operating in two different PIG modes: 1) with hot cathodes, and 2) with one hot cathode. It is shown that thses two modes of operation are equally efficient in producing a given plasma density; however, the one-hot-cathode operation requires higher voltage drops across the tube. (Author)

AD-433 951 Div. 8
OTS price $2.60

Electronic Defense Lab., Mountain View, Calif.
POLARIZATION COUPLING CURVES,
by Bernard J. Lamberty. 27 Jan 64, 21p. Rept. no. TM M593
Contract DA36 039AMC00088E
Unclassified report

Descriptors: (*Antennas, Polarization), (*Polarization, Tables), Electromagnetic waves, Angle of arrival, Mathematical analysis.

This report presents curves of polarization coupling of antennas having various fixed values of axial ratio as a function of the axial ratio and orientation angle of incident waves. Some examples of the meaning and use of these curves for determining over-all system parameters are discussed. (Author)

AD-433 975 Div. 8, 4, 25, 14
OTS price $5.60

General Electric Co., Schenectady, N. Y.
SEMICONDUCTOR DEVICE CONCEPTS.
31 Jan 64, 55p. Scientific rept. no. 6
Contract AF19 628 329, Proj. 4608, Task 460805
AFCRL 64 135 Unclassified report

Descriptors: (*Semiconductor devices, Lasers), (*Lasers, Materials), Impurities, Callium alloys, Arsenic alloys, Crystal growth, Electrochemistry, Intermetallic compounds, Electroluminescence, Antimony alloys, Phosphorus alloys.

Halogen transport synthesis of GaAs(x)P(1-x) was studied using a rotating tube vertical furnace. Laser quality material was produced using Te and Si as the donor impurities, and the homogeneity was improved. Measurements of composition, carrier concentration, and optical transparency are reported. A red-black effect was discovered which is helpful in selecting laser quality regions from GaAs(1-x)P(x) ingots having compostions near the direct-indirect limit. The growth of GaAs(1-x)P(x) from Ga solutions continued. The growing procedure was modified in a way that is expected to yield material of uniform composition. Further attempts to produce coherent light emission from GaSb and from Ga(x)In(1-x)Sb junctions was unsuccessful and this work has been discontinued. (Author)

AD-433 998 Div. 8, 4, 14
30, 25
OTS price $5.60

Naval Ordnance Lab., Corona, Calif.
FOUNDATIONAL RESEARCH PROJECTS OCTOBER-DECEMBER 1963.
Quarterly rept., 1 Mar 64.
1 Mar 64, 55p.
NAVWEPS 8183 Unclassified report

Descriptors: (*Parametric amplifiers, Metal films), (*Phosphorus compounds, Chemical reaction), (*Stroboscopes, Magneto-optic effect), (*Fermions, Magnetic fields), (*Paramagetic resonance, Measurement), Magnetic properties, Electroplating, Electroplating solutions, Coding, High temperature research, Azides, Mathematical analysis, Equations, Semiconductors, Heat-resistant plastics, Phosphines, Waveguides, Solid state physics, Spectroscopy, Naval research, Noise generators, Polymenization, Silicon compounds, Ferrite, Photomultipliers, Perturbation theory.

Reports are submitted of Foundational Research projects conducted during the second quarter of fiscal year 1964 in the following general areas: Coder Components, High Temperature Polymers, Magnetization Reversal, Semiconductor Physics, and Solid State Spectroscopy. (Author)

AD-434 047 Div. 8
OTS price $1.60

Ballistic Research Labs., Aberdeen Proving Ground, Md.
MILLIMETER WAVE DIODE FABRICATION,
by Donald Bauerle. Jan 64, 19p.
Proj. RDT&E1M523801A286
BRL TN1525 Unclassified report

Descriptors: (*Diodes (Semiconductors), Millimeter waves), Manufacturing methods, Crystal detectors, Tungsten, Silicon, Germanium alloys, Arsenic alloys, Chemical milling, Metal coatings, Nickel, Positioning devices (Machinery).

Receivers and measuring instruments operating in the millimeter wave length portion of the spectrum require wave guide components utilizing point contact diodes. Some of these components in the very short wave length range (less than 4 mm) are not commercially available and must be fabricated in the laboratory. This report describes the technique for fabricating diodes used in millimeter wave detectors, mixers and multipliers. (Author)

AD-434 051 Div. 8, 17
OTS price $1.60

Motorola Inc., Phoenix, Ariz.
MINIATURE THIN FILM INDUCTORS (MODIFICATION NO. 2).
Interim rept. no. 3, 1 Dec 63-1 Mar 64,
by F. R. Gleason. 1 Mar 64, 14p. Rept. no. 4003 3
Contract Nobsr85397, Proj. SR00803, Task 9636
Unclassified report

Descriptors: (*Coils, Ferrites), (*Ferrites, Films), Thickness, Encapsulation, Inductance, Temperature, Vapor plating, Electroplating, Gold, Permeability (Magnetic), Gold alloys, Rhodium alloys.

A program is described for fabricating miniature thin-film inductors. These inductors use flat spiral conducting paths on bulk ferrite substrates encapsulated with depositied ferrite film. The period covered from 1 December 1963 to 1 March 1964. Four tasks, all directed toward the problem of obtaining larger inductance values, have been pursued during this period. They are: (1) Study the effect of ferrite material thickness on the inductance of an encapsulated coil; it was determined that a 40-mil (1000 micron) thick layer of material is required for maximum permeability effect. (2) Fabricate spiral coils of increased air core inductance: The 1.8 microhenry 23-turn coil has not been completed. (3) Fabricate spiral coils of a gold-rhodium alloy so that a ferrite film deposited encapsulating these coils can be annealed or sintered at elevated temperatures, i.e., greater than 1050 C. (4) Study techniques for fabricating two coils in a mutually aiding inductive geometry on a single substrate. The coils are separated by a ferrite film deposit: Absorption of the gold plating solution by the ferrite has been a problem. This prevented the fabrication of a complete unit for evaluation. (Author)

AD-434 062 Div. 8
OTS price $2.60

Technical Research Group, Syosset, N. Y.
DEVELOPMENT OF A LOW-NOISE MILLIMETER-WAVE PARAMETRIC AMPLIFIER.
Quarterly progress rept. no. 2, 1 Oct 63-1 Jan 64,
by J. Kliphuis and D. Neuf. 1 Jan 64, 30p.
Contract DA36 039AMC02365E, Proj. 1G6 22001A056
Unclassified report

Descriptors: (*Parametric amplifiers, Millimeter waves), (*Millimeter waves, Parametric amplifiers), (*Varactor diodes, Parametric amplifiers), Noise (Radio), Temperature, Gain, Bandwidth, Numerical analysis, Frequency, Epitaxial growth, Gallium alloys, Arsenic alloys, Ceramic materials, Resonance, Extremely high frequency, Mechanical properties, Waveguide circulators, Standing wave ratios, Ferrites.

The theoretical values of optimum noise temperature and gain-bandwidth product for a one-port non-degenerate parametric amplifier are derived

under completely general conditions. A set of universal design curves showing the noise temperature and gain-bandwidth product as functions of the ratio of signal and idler frequencies (with the ratio of the diode figure of merit and the signal frequency as a parameter) are included. Measurements taken on the epitaxial Ga As junctions, packaged in ceramic cartridges, indicate that the self-resonant frequency of this configuration is too low for use in a 94-Gc amplifier. Various mounting configurations for the unpackaged junction are being evaluated. (Author)

AD-434 065 Div. 8, 26
OTS price $3.60

Chicago Telephone Supply Corp., Elkhart, Ind.
PRODUCTION ENGINEERING MEASURE FOR SUBMINIATURE, TRANSISTOR TYPE POTENTIOMETERS.
Quarterly progress rept. no. 10, 1 Oct-31 Dec 63, by A. A. Grunwald and C. L. Holmes. 31 Dec 63, 32p.
Contract DA36 039sc85976
Unclassified report

Descriptors: (*Potentiometers, Manufacturing methods), Production, Subminiature electronic equipment, Tests, Dielectric properties, Vibration, Temperature, Seals (Stoppers), Mechanical properties, Torque, Moistureproofing, Life expectancy, Tables, Reliability (Electronics).

The 1800 units required for Preproduction Testing were submitted to the test facilities and testing was completed. No failures occurred in dielectric strength, effect of soldering, high frequency vibration, temperature coefficient, temperature cycling, low temperature exposure, and shaft seal. All visual and mechanical inspections were satisfactory except the stop torque. Controls exceeding the maximum allowable change in resistance were noted only on rotational life and moisture resistance tests. The failures on rotational life were caused by mechanical defects in the controls. The 5K ohm and 25K ohm controls passed the 30 cycle moisture resistance test with no failures. The 2400 units for the 10,000-hour load life test have completed 500 hours of testing with no failures. Two groups completed 1,000 hours of testing with no failures. (Author)

AD-434 067 Div. 8, 26
OTS price $2.60

ITT Electron Tube Div., Roanoke, Va.
PRODUCTION ENGINEERING MEASURE FOR TYPE FW-202 BARRIER GRID STORAGE TUBE.
Quarterly progress rept. no. 9, 1 July-30 Sep 63. by D. D. Duggan. 30 Sep 63, 30p.
Contract DA36 039SC85967
Unclassified report

Descriptors: (*Storage tubes, Manufacturing methods), (*Manufacturing methods, Storage tubes), Production, Tests, Electron beams, Electron tube parts, Bonding, Processing, Thickness, Electron guns, Evaporation, Secondary emission, Oxidation, Electrophoresis, Coatings.

Five barrier grid tubes were assembled and exhausted. The first tube, serial no. 1001, was tested and had normal operation, for beam current and repeater and cancellation tests. The five tubes manufactured exhibited poor beam current characteristics. Target bonding processing and assembly problems were overcome. (Author)

AD-434 071 Div. 8
OTS price $4.60

Little, Arthur D., Inc., Cambridge, Mass.
METHODS FOR LOW POWER TEMPERATURE CONTROL.
Quarterly rept. no. 2, 1 Aug-31 Oct 63, by Igor A. Black and John F. Peterson. 31 Oct 63, 43p.
Contract DA36 039AMC02207E, Task 1G6 22001A058 02
Unclassified report

Descriptors: (*Crystal ovens, Design), (*Quartz, Crystals), (*Crystals, Crystal ovens), Manufacturing methods, Thermal insulation, Temperature control, Miniature electronic equipment, Switching circuits, Thermostats, Electron beams, Welding, Sealing compounds, Glass.

This report describes work on an investigation of methods, techniques, and devices by which the temperature of a quartz crystal can be maintained, with a minimum of power, at a nominal operating temperature over environmental temperature extremes. The work includes investigations of second-order effects applicable to the design of low-power crystal ovens. End products resulting from the study are three types of ovens: (1) a 3 cubic inch, 500 milliwatt oven (Type J6) requiring accessibility to the crystal and operating at +75 ±1 C over a -55 to +60 C ambient; (2) a 3 cubic inch, reduced power, sealed oven (Type K6G) with similar operating requirements; and (3) a 4 cubic inch, 250 milliwatt oven (Type L6) requiring accessibility to a chamber capable of housing two crystals and operating at 0 to ±1 C over a -55 to 0 C ambient. (Author)

AD-434 075 Div. 8, 6
OTS price $5.60

Raytheon Co., Waltham, Mass.
RESEARCH ON LOW NOISE CATHODE DEVELOPMENT.
Interim engineering rept. no. 3, 1 Nov 63-31 Jan 64,
by S. R. Steele, W. Getty, S. Mao and D. Bobroff. 31 Jan 64, 52p. Rept. no. S 621
Contract AF33 657 11003
Unclassified report

Descriptors: (*Electron guns, Traveling wave tubes), (*Cathodes (Electron tubes), Noise (Radio)), Test equipment (Electronics), Measurement, Velocity, Electron density, Photons, Photocathodes, Cesium compounds, Antimony compounds, Computers, Equations, Integral equations, Laboratory equipment, Semiconductors.

A vehicle for measuring the effective noise temperature of cathodes was completed and noise measurements of conventional thermionic cathodes are in progress. Calculations as to the effect of the narrow velocity spread and low beam currents from potential low noise cathodes on gun parameters were made. Guns must be somewhat longer than are currently in use. Some experiments were made using freezing drying as a method for fabricating uniformly dispersed thermionic cathode surfaces. Experiments are being initiated using low temperature photoelectric cathodes as low noise sources. A theoretical treatment of velocity and density distribution in a simple model of a low noise gun is being carried out with the help of a computer. (Author)

AD-434 099 Div. 8
OTS price $2.60

Cooley Electronics Lab., U. of Michigan, Ann Arbor.
DERIVATION OF EROSPACE ANTENNA COUPLING - FACTOR

INTERFERENCE PREDICTION TECHNIQUES.
Interim technical rept. no. 7, 1 Aug-1 Nov 63,
by D. K. Adams, W. R. DeHart, R. M. Kalafus, A. I. Simanyi and R. B. Harris. Jan 64, 23p.
Rept. no. 4957 7P
Contract AF33 657 8178
Unclassified report

Descriptors: (*Antennas, Design), Horn antenna, Spiral antenna, Antenna feeds, Antenna radiation patterns, Radiofrequency interference, Standing wave ratios, Antenna lobes, High frequency, Dielectrics, Beams (Electromagnetic).

Three Archimedean spirals were tested for antenna patterns and coupling patterns: (1) circular, (2) square, and (3) dielectric-cavity-backed circular. The latter was used in the fundamental mode, with out-of-phase currents at the feed. The square spiral exhibits a broader beam, a better ellipticity ratio, and a larger VSWR over the band, than of the circular spiral. The effect of the dielectric is to broaden the beam, since the antenna radiates from a smaller region. This broadening effect is significant when the cavity thickness is greater than one-quarter wavelength. Another square spiral, oppositely wound, was tested for coupling patterns, and exhibited essentially mirror-image behavior to the first square spiral. A theoretical consideration of mounted flush-horn antennas indicates rough coupling estimates may be obtained rather simply from curves given. The feed and geometry of the horn determine the aperture field distribution; this, in turn, determines the fields in space and along the ground plane. Phase variations due to horn flare tend to smooth out sidelobes and broaden the beam. Fresnel zone phenomena are not considered. (Author)

AD-434 109 Div. 8
OTS price $14.50

Naval Ammunition Depot, Crane, Ind.
INFORMATION ON MICROELECTRONICS FOR NAVY AVIONICS EQUIPMENT.
1 Apr 64, 216p.
NAD CI QE C64 212 Unclassified report

Descriptors: (*Microminiaturization (Electronics), Naval equipment), Electronic equipment, Airborne, Naval aviation, Specifications, Tests, Circuits.

AD-434 111 Div. 8
OTS price $2.60

Picatinny Arsenal, Dover, N. J.
PREFERRED PROCEDURES FOR THE SELECTION, APPLICATION, AND HANDLING OF MULTICONTACT ELECTRICAL CONNECTORS,
by R. Van Ness. June 63, 30p.
PA TM1242 Unclassified report

Descriptors: (*Electric connectors, Selection), Handling, Nuclear weapons, Army equipment.

This report suggests preferred methods and design features to overcome problems associated with the use of multicontact electrical connectors. Recommended sources for properly designed connectors are also included. (Author)

AD-434 146 Div. 8
OTS price $7.60

Electron Physics Lab., Univ. of Michigan, Ann Arbor.
SOLID-STATE MICROWAVE RESEARCH.
Interim Scientific rept. no. 1, 16 Sep 63-1 Feb 64,
by D. C. Hanson, J. E. King, J. E. Rowe and C. Yeh. Mar 64, 71p. Rept. no. 06031 1S
Contract AF33 657 11587, Proj. 06031
Unclassified report

Descriptors: (*Microwaves, Solid state physics), (*Solids, Semiconductors), Phonons, Paramagnetic resonance, Piezoelectric effect, Parametric amplifiers, Electromagnetic waves, Electrons, Masers, Electric fields, Magnetic fields, Lasers, Theory.

The general nature of microwave interactions in bulk solid-state materials is the principal objective of this broad study. The specific research tasks described in this report relate to the generation and/or amplification of coherent electromagnetic radiation in the microwave-optical regime of the spectrum. In particular the following three subjects are currently under study and discussed in this report, (1). general parametric phonon interactions in solids, (2). radiation from bulk materials, and (3). traveling-wave phonon interactions. The general nature of each of these phenomena is outlined and both theoretical and experimental active programs are outlined. (Author)

AD-434 170 Div. 8
OTS price $6.60

Texas Instruments, Inc., Dallas.
OPTOELECTRONIC FUNCTIONAL ELECTRONIC BLOCKS.
Interim engineering rept. no. 2, 1 Nov 63-31 Jan 64,
by J. R. Biard. 27 Mar 64, 61p. Rept. no. 04 64 20
Contract AF33 657 11552
Unclassified report

Descriptors: (*Semiconductor devices, Integrated circuits), Silicon, Pulse amplifiers, Photoelectric cells (Semiconductor), Direct current, Electroluminescence, Arsenic alloys, Gallium alloys, Electron optics, Diffusion, Coupling circuits, Design, Transistors, Diodes (Semiconductor), Selenium alloys, Glass, Luminescence, Photomultipliers, Zinc compounds, Arsenic compounds.

Investigations of optoelectronic phenomena are being performed in an effort to extend the applicability of integrated circuits. The combination of the isolation feature of optical coupling with existing silicon integrated circuit technology has suggested a new series of Optoelectronic Functional Electronic Blocks which provide functions previously impossible or extremely difficult to attain in solid-state form. The program has been divided into two tasks. Task I covers the design and fabrication of an Optoelectronic Pulse Amplifier and an Optoelectronic DC amplifier. Task II is concerned with the semiconductor technology necessary to adequately implement the two Optoelectronic Functional Electronic Blocks selected for study. The technology investigations under Task II include studies of (1) Optical Coupling Structures, (2) GaAs - GaAs(x)P(1-x), (3) Slice Processing, (4) Junction Passivation. (Author)

AD-434 188 Div. 8
OTS price $7.60

TRW Semiconductors, Inc., Lawndale, Calif.
TRANSISTOR, VHF, SILICON, POWER (10W-500MC).
Quarterly rept. no. 1, 1 July-30 Sep 63,

Division 8 - ELECTRONICS AND ELECTRONIC EQUIPMENT

By J. Crishal, J. Durst, J. Ewins and R. Neville.
30 Sep 63, 75p. Rept. no. 59RD1
Contract DA36 039AMC03189E
Unclassified report

Descriptors: (*Transistors, Very high frequency), Silicon, Design, Radiofrequency power, Specifications, Mechanical drawings, Manufacturing methods, Vapor plating, Metal films, Equations, Diffusion.

In this report a design is derived which will assure an output power of 10 watts at a frequency of 500 megacycles and a collector voltage of 28 volts. This design is an annulus of centerline radius 44.6 mils and width of 4 mils. The device will employ diffusions designed to produce a 0.4 micron base width and will be contained in a minimum inductance package such as the Disc-Power-Strap Package discussed Paragraph 1.4 of Section III. (Author)

AD-434 190 Div. 8
OTS price $2.60

Illinois Univ., Urbana, Engineering Experiment Station.
RESEARCH ON LOG-PERIODIC ARRAYS OF SLOTS,
by J. W. Greiser. Jan 64, 29p. Technical rept. no. 3
Contract NObsr85243
Unclassified report

Descriptors: (*Slot antennas, Design), Coupled antennas, Phase control devices, Antenna radiation patterns, Printed circuits, Cavity resonators, Electrical impedance.

AD-434 209 Div. 8, 26
OTS price $2.60

General Electric Co., Owensboro, Ky.
DEVELOPMENT OF AN IMPROVED JAN 6299.
Quarterly progress rept. no. 9, 1 Oct-31 Dec 63, 31 Dec 63, 29p.
Contract DA36 039sc85953
Unclassified report

Descriptors: (*Electron tubes, Manufacturing methods), Specifications, Tests, Electrical properties, Shock resistance, Vibration, Humidity, Temperature, Life expectancy.

An evaluation was made of advanced tube manufacturing techniques and application where feasible to JAN 6299. Specifications for preproduction tubes and the data taken during testing are included. (Author)

AD-434 235 Div. 8
OTS price $3.60

General Electric Co., Owensboro, Ky.
FEASIBILITY STUDY OF POWER TRIODE.
Interim engineering rept., 1 Sep 63-31 Jan 64. 31 Jan 64, 39p.
Contract AF33 657 12329
Unclassified report

Report on Research and Investigation on Radiation Resistant, High Temperature Thermionic Circuitry.
Descriptors: (*Triodes, Feasibility studies), Power, Configuration, Cathodes (Electron tubes), Electrodes, Temperature, Electrical properties, Computers, Life expectancy, Radiation damage, Heat transfer, Electric currents, Electron tube parts.

The relative merits of planar and cyclindrical triode geometries are discussed, together with the heat dissipation problem and required cathode area. The salient features of both a planar and a cylindrical electrode tube design are presented. The functional purpose is stated for various parts and assemblies. Data relating tube temperature dependence upon plate power input and saturated plate current dependence upon temperature were obtained from a prototype triode with basket type wire mesh grid. The basket grid proved undesirable because of grid deformation tendencies. Planar power triodes with parallel wire grids were constructed which had plate family characteristics very near the objective. Obtaining a high level of cathode emission continues to be a problem.

AD-434 238 Div. 8, 25
OTS price $9.10

Electronics Research Lab., Univ. of California, Berkeley.
(No title)
Consolidated quarterly progress rept. no. 12, for period ending 15 Feb 64.
15 Feb 64, 106p.
Unclassified report

Descriptors: (*Electronics, Research program administration), Biology, Circuits, Theory, Electron beams, Plasma physics, Propagation, Solid state physics, Stochastic processes, Control systems, Optimization.

AD-434 240 Div. 8
OTS price $8.10

Cornell Univ., Ithaca, N.Y., School of Electrical Engineering.
OPTIMIZATION OF POLE SENSITIVITY IN ACTIVE RC NETWORKS,
by N. M. Herbst. 15 Dec 63, 89p. Research rept. EE569; TR77
Contract DA36 039AMC00034E
Unclassified report

Descriptors: (*Circuits, Sensitivity), (*Sensitivity, Circuits), Resistors, Capacitors, Gain, Electric filters, Programming (Computers), Feedback, Mathematical analysis, Synthesis, Electrical properties.

The sensitivity of active RC networks with respect to variations in the gain of active elements is studied by means of the zeros of the pole-sensitivity function. It is demonstrated that the zeros of sensitivity indicate the effect of the polynomial decomposition of a synthesis procedure upon the pole sensitivity. Methods of realizing network functions with prescribed decompositions are discussed, and several specific networks are given. (Author)

AD-434 263 Div. 8, 5
OTS price $2.60

ITT Communications Systems, Inc., Paramus, N. J.
CURRENT PRACTICES L.O.S. MICROWAVE SITE AND PATH ENGINEERING FOR MAJOR, LONG HAUL, COMMON CARRIER SYSTEMS,
by H. H. Pine. 16 Mar 62, 21p.
Contract AF19 626 5
ESD TDR64 229 Unclassified report

Descriptors: (*Microwave communication systems, Site selection), Antenna radiation patterns, Ranges (Distance), Antenna masts, Antenna feeds, Beams (Electromagnetic), Reflection, Radiofrequency interference.

This report summarizes criteria currently used by major common carriers in the United States to select radio paths for long haul multi-channel microwave systems. (Author)

AD-434 272 Div. 8
OTS price $4.60

General Electric Co., Auburn, N. Y.
A PRODUCTION ENGINEERING MEASURE FOR THE IMPROVEMENT OF PRODUCTION TECHNIQUES TO INCREASE THE RELIABILITY FOR DIFFUSED SICON CONTROLLED SWITCHES TYPES 2N689.
Quarterly progress rept. no. 2, 1 Oct-31 Dec 63, by J. N. Frank, R. C. Rome, H. Wawrousek and W. R. Comstock. 31 Dec 63, 44p.
Contract DA36 039AMC03619E
Unclassified report

Descriptors: (*Electronic switches, Crystal rectifies), (*Crystal rectifiers, Electronic switches), Silicon, Difussion, Production, Manufacturing methods, Alloys, Transducers, Welding, Ultrasonic radiation, Seals (Stoppers), Crystal lattice defects, Electric currents, Surface properties, Electric potential, Electrodes.

Progress in the following areas is discussed: fabrication of the four-transducer ultrasonic torsional welder; completion of the ultrasonic tubulation-seal process; fabrication of all-diffused devices without gold doping; continuation of experiments on the influence of dislocations in silicon crystals upon the electrical characteristics of the all-diffused 2N689 type device; and step stressing of the present alloy-diffused device. (Author)

AD-434 322 Div. 8, 26
OTS price $3.60

Linde Co. Div. of Union Carbide Corp., Cleveland, Ohio.
PRODUCTION ENGINEERING MEASURE FOR IMPROVED RELIABILITY OF SOLID TANTALUM ELECTROLYTIC CAPACITORS.
Quarterly rept. no. 2, 1 Oct-31 Dec 63, by J. E. Riley. 31 Dec 63, 38p.
Contract DA36 039AMC03624E
Unclassified report

Descriptors: (*Tantalum capacitors, Production), (*Production, Manufacturing methods), (*Manufacturing methods, Tantalum capacitors), Performance (Engineering), Test facilities, Life expectancy, Electrical properties, Tantalum, Physical properties, Chemical properties, Temperature, Electric potential, Reliability (Electronics), Test equipment (Electronics).

Work was concerned primarily with the completion of the acceleration factor matrix test and the assembly of the pilot laboratory. Work was also performed on the chemical and physical evaluation of various vendor tantalum powders. (Author)

AD-434 329 Div. 8
OTS price $17.50

IIT Research Inst., Chicago, Ill.
PHYSICS OF FAILURE IN ELECTRONICS. VOLUME 2, by M. F. Goldberg, Joseph Vaccaro. 6 Mar 64, 271p.
Unclassified report

Proceedings of the Second Annual Symposium held, 25-26 Sep 63, Chicago, Ill.

Descriptors: (*Electronic equipment, Failure (Mechanics)), (*Failure (Mechanics), Symposia), (*Reliability (Electronics), Electronic equipment), Resistors, Metal films, Aging (Materials), Capacitors, Mathematical prediction, Transistors, Stresses, Dioded (Semiconductor), Noise (Radio), Silicon, Germanium, Traveling wave tubes, Masers, Miniature electronic equipment, Tunnel diodes.

AD-434 345 Div. 8, 26
OTS price $10.50

Bliley Electric Co., Erie, Pa.
PRODUCTION ENGINEERING MEASURE CR-(XM-40)/U HIGH-PRECISION CRYSTAL UNITS.
Final rept., 29 May 61-29 Nov 63, by J.M. Wolfskill and Robert Mouck. Dec 63, 134p.
Contract DA36 039SC85958
Unclassified report

Descriptors: (*Quartz resonators, Manufacturing methods), Processing, Crystal holders, Frequency, Stability, Production, Shock resistance, Medium frequency, Golds, Plating, Capacitance, Test methods, Aging (Materials), Programming (Computers), Quality control, Industrial equipment.

The CR-(XM-40)/U units have a frequency stability of better than 5 parts in 10 to the 10 per day (aging), a frequency stability of better than 1 part in 10 to the 9th for a 1-db change in drive level, and a frequency stability of at least 1 part in 10 to the 7th for 30g, 11 millisecond chock. The nominal frequency is 2.5 megacycles; tolerance on nominal is ±1.5 cycles. The units use gold-plated quartz resonators, horizontally mounted in evacuated, T-11 size glass holders. The crystals are designed to operate on the fifth overtone mode, into a load capacitance of 50 pf. They are intended to operate at a constant temperature, in the region from +43 C to +57 C, as specified for each unit by the manufacturer. A brief review is presented of the project and includes a Process Manual which gives details of all processing operations, outlines the quality control plan which was used to monitor and control the production, and describes equipment and testing techniques. (Author)

AD-434 351 Div. 8
OTS price $12.50

Pacific Semiconductors Inc., Lawndale, Calif.
PROCESS AND FLOW CHART MANUAL FOR INTERDIGITATED SILICON TRANSISTOR PROGRAM.
Rept. for 18 Sep 61-8 Mar 63
Nov 63, 176p.
Contract AF33 600 43029, Proj. 7 850
Unclassified report

Descriptors: (*Semiconductor devices, Manufacturing methods), (*Transistors, Silicon), (*Instruction manuals, Manufacturing methods), Processing, Industrial equipment, Operation, Maintenance, Test equipment (Electronic), Test methods, Precision finishing, Etched crystals, Cleaning.

Division 8 - ELECTRONICS AND ELECTRONIC EQUIPMENT

AD-434 352 Div. 8
OTS price $12.50

Southwest Research Inst., San Antonio, Tex.
USE OF THE BEVERAGE ANTENNA IN WIDE APERTURE HIGH FREQUENCY DIRECTION FINDING. PART IV: THEORY.
Interim rept. 4 Dec 63-3 Mar 64
by Douglas N. Travers, Paul E. Martin and W. M. Sherill. 23 Mar 64, 171p.
Contract NObsr89345, Proj. SF0010805, Task 9094
Unclassified report

Descriptors: (*Antennas, Direction finding), (*Direction finding, Antennas), Equations, Azimuth, Antenna radiation patterns, Antenna configurations, High frequency, Beams (Electromagnetic), Errors, Polarization, Electrical impedance, Medium frequency, Very high frequency, Ranges (Distance), Theory, Bandwidth, Programming (Computers), Sensitivity.

A detailed analysis is presented for a circular array of Beverage antennas over a conducting earth. Equations are derived for azimuth and elevation patterns for any number of similar antennas in the array taken any number at a time, spaced in any manner, and summed in any arbitrary manner with or without phasing. The analysis provides both ground wave and sky wave patterns. For sky wave patterns the polarization of the incident field may be linear or elliptical. Calculations show the sector arrays considered so far to have low polarization error. Polarization error is further reduced as beamwidth is reduced. (Author)

AD-434 398 Div. 8, 5
OTS price $9.10

Martin-Marietta Corp., Orlando, Fla.
RESEARCH STUDY FOR ELECTRONICALLY-STEERABLE GROUND-BASED ANTENNA SYSTEM.
Quarterly progress rept. no. 2, 1 Oct-31 Dec 63, by G. P. Kefalas, J. L. Connors and A. A. Segal. Jan 64, 102p. Rept. no. OR3801
Contract DA36 039AMC02368E, Proj. 3A99 12 001, Task 1G620501A4480110
Unclassified report

Descriptors: (*Antennas, Electronic scanners) (*Communication satellites (Active), Antennas) Antenna configurations, Surface-to-air, Air-to-surface, Mobile, Ground support equipment, Tracking, Satellite networks, Beams (Electromagnetic), Antenna lobes, Travelling wave tubes, Radiofrequency amplifiers, Tunnel diodes, Microwave amplifiers, Mixers (Electronic), X band, S band, Electron tubes, Circuits, Klystrons, Mechanical drawings.

Efforts were continued on development of electronically-steerable ground-based antennas as applied in communications systems employing many satellites. This report details progress in the state-of-the art survey. Techniques and component evaluation, and system synthesis and analysis phases. (Author)

AD-434 401 Div. 8
OTS price $7.60

Radiation Inc., Melbourne, Fla.
STABILITY OF NULL VOLTAGE OF HALL GENERATORS FOR DIGITAL TRANSDUCER READOUT HEADS.
Supplemental rept. no. 3 for 63,
by C. B. Pear, Jr. Dec 63, 74p.
Contract AF33 657 7681, Proj. 4107, Task 410714
Unclassified report

Descriptors: (*Hall effect, Generators), (*Transducers, Hall effect), Digital recording systems, Magnetic recording systems, Stability, Digital systems, Electric potential, Magnetic fields, Temperature, Resolution, Theory, Indium alloys, Arsenic alloys, Tests, Measurement, Background, Electrical properties.

Efforts concern an attempt to find the extent to which drift of the null or zero field voltage limits the usefulness of Hall generators in flux responsive magnetic reading heads. A search of the literature is covered and samples representing the best commercially available construction were tested. For the conditions imposed by a digital transducer application, it appears that heads with a resolution of 5000 bits per inch can be operated without adjustments in a temperature range up to 100 C and with greater resolution over smaller temperature ranges. Erratic changes with temperature limit the degree to which compensation can be effective. (Author)

AD-434 402 Div. 8, 26
OTS price $2.60

Texas Instruments, Inc., Dallas.
PRODUCTION ENGINEERING MEASURES TO IMPROVE TRANSISTOR RELIABILITY.
Quarterly progress rept. no. 4, 1 Apr-30 June 63, by Sam McCleese, Doyce Briggs and R. L. Petritz. 30 June 63, 27p.
Contract DA36 039sc86730
Unclassified report

Descriptors: (*Transistors, Production), (*Production, Manufacturing methods), (*Manufacturing methods, Transistors), Crystal growth, Silicon, Electric wire, Welding, Environmental tests, Etched crystals, Cleaning, Ceramic materials, Reliability (Electronics).

AD-434 436 Div. 8, 26, 25
OTS price $1.60

Piezo Crystal Co., Carlisle, Pa.
PRODUCTION ENGINEERING MEASURE.
Quarterly rept. no. 7, 30 Dec 62-31 Mar 63, 31 Mar 63, 17p.
Contract DA36039SC85971
Unclassified report

Descriptors: (*Quartz, Tests), Measurement, Manufacturing methods, Polishes, Quality control, Production, Engineering, Very high frequency, Electrodeposition, Nickel, Quartz oscillators.

The high reject problem due to sharp resistance peaks over the temp. run -55 C to +90 C, was reduced to a minimum, probably less than 10%. The sample groups in all frequency ranges 150 mc, 162 mc, 174 mc, 188 ,c and 200,c in both cultured and natural quartz were completed and submitted for testing to Victor Electronics Systems Company. Pre pilot runs on all frequencies were made using the latest techniques developed during the production engineering measure. (Author)

AD-434 443 Div. 8, 26
OTS price $7.60

Bomac Labs. Inc., Beverly, Mass.
BL-223 A C-BAND MAGNETRON. PRODUCTION ENGINEERING MEASURES PROGRAM. SECTION I. VOLUME I.

STEPS I AND II.
Final rept. 19 Apr 60-19 July 62,
by Kenneth A. Todd, Jr., Leonard Safran and
Richard S. Briggs. 19 July 62, 72p.
Contract DA36 039SC85946
Unclassified report

Descriptors: (*Magnetrons, Production), (*Production, Manufacturing methods), (*Manufacturing methods, Magnetrons), Physical properties, Electron tube parts, Materials, Performance (Engineering), Vibration, Life expectancy, Data, Tables, Failure (Mechanics).

The overall tube length and weight of the BL-223 was decreased. These reductions were accomplished by reducing the length of the gear housing, its associated connector, and anode assembly. Attempts were made to eliminate the expensive copper-clad molybdenum material used in the anode vanes, but the test results proved negative. Although some anode assemblies were successfully made, the process involved resulted in greater cost and lengthening of the assembly time. Investigations were made into using a new lower cost, high ductile, copper-clad molybdenum material. This new material was satisfactorily used thoughout the pilot production run. (Author)

AD-434 543 Div. 8, 5
OTS price $19.75

Aerospace Corp., Los Angeles, Calif.
RESEARCH AND EXPERIMENTATION ON SPACE APPLICATIONS OF MILLIMETER WAVES.
Semiannual technical note, 1 Jan-30 June 63,
by J. Stacey. 5 Feb 64, 331p. Rept. no.
TDR169 3250 41TN2
Contract AF04 695 169
SSD TDR63 294 Unclassified report

Descriptors: (*Space communication systems, Parabolic antennas), (*Parabolic antennas, Space communication systems), (*Ground support equipment, Construction), Resolution, Millimeter waves, Reentry vehicles, Propagation, Radio astronomy, Data processing systems, Reflectors, Electrical properties, Production, Manufacturing methods, Antenna radiation patterns, Machining, Precision finishing, Servomechanisms, Antenna feeds, Polarization, Measuring devices (Electrical & electronic), Test equipment, Instrumentation, Effectiveness.

Progress is reported in the planning and construction of the Space Radio Systems Facility, a facility for studying the utility of systems objectives in the millimeter wavelength region. The Space Radio Systems Facility consists of a precise 15-ft antenna with its associated digital control and data processing equipment. A description of the instrumentation is given, and the initial observational plans are outlined. A technical description is given of the planning and fabrication of the precision large aperture antenna. The aperture is circular, and the configuration is Cassegrainian. Surface tolerance measurements indicate a prospective capability of efficient operation at wavelengths down to 1 mm (300 Gc) over the total 15-ft diameter. A description is given of the peripheral components and the associated digital equipment required to accomplish precise automatic control of the antenna attitude and realtime data reduction. (Author)

AD-434 553 Div. 8
OTS price $1.60

Radio Corp. of America, Harrison, N. J.
AN L-BAND TUNNEL DIODE OSCILLATOR.
Quarterly progress rept. no. 6, 1 Sep-30 Nov 63,
by D. E. Nelson, R. Gold and E. T. Casterline.
30 Nov 63, 20p.
Contract DA36 039sc90773, Proj. 166 22001A056
Unclassified report

Descriptors: (*Oscillators, L band), (*Tunnel diodes, Oscillators), (*L band, Oscillators), Electrical properties, Power, Temperature, Transistors, Production, Manufacturing methods, Performance (Engineering), Voltage regulators, Soldering, Gallium alloys, Arsenic alloys.

Work continued on the development of distributed junction diodes. Annular junction diodes were successfully fabricated; however, higher carrier concentrations in the semiconductor material is needed to give lower diode capacitance and higher cut-off frequency. The second prototype oscillator model was delivered and the third prototype was tested and delivered. This third prototype oscillator gave a power output of 19 mw and easily met the ± 2 Mc maximum frequency variation for ± 10% change in bias voltage.

AD-434 573 Div. 8
OTS price $3.60

Bell Telephone Labs., Inc., Whippany, N. J.
MICROWAVE DIODE RESEARCH.
Quarterly progress rept. no. 6, 10 Sep-9 Dec 63,
by H. J. Fink, R. L. Rulison and D. L.
Scharfetter. 10 Mar 64, 32p. Rept. no. 15
Contract DA36 039sc89205, Proj. 16622001A056
Unclassified report

Descriptors: (*Diodes (Semiconductors), Microwave equipment), (*Tunnel diodes, Microwave equipment), (*Varactor diodes, Microwave equipment), Microwave amplifiers, Limiters, Crystal mixers, Harmonic oscillators, X band, Superhigh frequency, Extremely high frequency, Electric currents, Electric fields, Diffusion, Electric potential, Epitaxial growth, Surface properties, Reflection, Silicon, Impurities, Gold, Fixed contacts, Boron, Phosphorus, Manufacturing methods.

Low-impedance circuits are being fabricated for an X-band tunnel diode amplifier. Minority carrier injection by so-called noninjecting contacts is discussed. It is shown that at high currents, the injection ratio (ratio of minority carrier current to total current) rises linearly with current, and can attain significant values. For example, a minority carrier injection ratio of about 5 per cent will be obtained at a current density of 350 amps/cm sq. in a 5-ohm-cm diode. The reason for this rise in injection ratio is that the minority carrier current is enhanced by a driftfield component much larger than the diffusion current which dominates at low bias. The precise amount of stored charge at high currents depends upon the characteristics of the epitaxial-substrate interface and can become very significant when the interface is highly reflecting (i.e. has low surface-recombination velocity). (Author)

AD-434 575 Div. 8, 26
OTS price $2.60

Microwave Associates, Inc., Burlington, Mass.
VARACTOR DIODE INDUSTRIAL PREPAREDNESS MEASURES.
Quarterly progress rept. no. 12, 25 Mar-25 June

63.
25 June 63, 26p.
Contract DA36-039sc85941
Unclassified report

Descriptors: (*Varactor diodes, Manufacturing methods), (*Manufacturing methods, Varactor diodes), Production, Silicon, Diffusion, Resistance (Electrical), Measurement, Microwave equipment, Frequency, Glass, Welding, Fixed contacts, Bonding, Seals (Stoppers), Capacitance.

Efforts continued on a program to mass-produce a microwave silicon diffused mesa varactor diode. Work was performed to determine the dependence of series resistance on measurement frequency. Glass varactor diodes were tested for series resistance at both 500 Mc and 1120 Mc. The series resistance measurement consists of shunting a transmission line with a varactor, and it was adopted because of its convenience and reproducibility. At low measurement frequencies circuit losses become important and there is evidence that indicates that series resistance should be measured in the vicinity of 1 to 2 Gc to obtain satisfactory results. A new welded varactor package style is also discussed. This varactor package has allowed the use of a bonded contact, open type construction for ease of fabrication, and welded final seal which has provided for a more reliable finished semiconductor product. (Author)

AD-434 576 Div. 8, 26
OTS price $4.60

Microwave Associates, Inc., Burlington, Mass.
VARACTOR DIODE INDUSTRIAL PREPAREDNESS MEASURES.
Quarterly progress rept. no. 13, 25 June-25 Sep 63.
25 Sep 63, 49p.
Contract DA36 039sc85941
Unclassified report

Descriptors: (*Varactor diodes, Manufacturing methods), (*Manufacturing methods, Varactor diodes), Diffusion, Silicon, Microwave equipment, Production, Tests, Life expectancy, Frequency, Power, Electric currents, Capacitance, Acceleration, Shock resistance.

Efforts continues on a program to mass-produce a microwave silicon diffused mesa varactor diode. Three different package-style varactor diodes were manufactured. These diodes were submitted to the requisite tests. Data were taken and test results are presented. Manufacturing operations flow charts and yield figures are also presented for this phase. (Author)

AD-434 579 Div. 8
OTS price $8.60

Stanford Research Inst., Menlo Park, Calif.
HF COMMUNICATION EFFECTS SIMULATION: COMPARISON OF THE FORT MONMOUTH/PALO ALTO CIRCUIT PERFORMANCE WITH COMPUTER PREDICTIONS.
Interim technical rept. 4,
by Harry A. Turner and Edel M. Young. Jan 64, 98p.
Contract DA36 039sc87197, SRI Proj. 3670
Unclassified report

Descriptors: (*Ionospheric propagation, High frequency), Mathematical prediction, Simulation, Mathematical models, Absorption, Periodic variations, Signal-to-noise ratio.

Observed and predicted HF propagation data are compared. Observed data were taken by oblique-incidence ionospheric sounders, the Philips sounder (November 1961 and February 1962) and the Granger Associates sounder (1963), operated between Fort Monmouth, New Jersey and Palo Alto, California. Predictions were taken from the HF propagation prediction program written by Stanford Research Institute for use on the IBM 7090 computer. The comparison was undertaken in order to find how well the computer prediction methods predict skywave propagation and where these methods can be improved. (Author)

AD-434 611 Div. 8, 26
OTS price $1.60

Microwave Associates, Inc., Burlington, Mass.
VARACTOR DIODE INDUSTRIAL PREPAREDNESS MEASURES.
Quarterly progress rept. no. 14, 25 Sep-25 Dec 63.
25 Dec 63, 19p.
Contract DA36 039sc85941
Unclassified report

Descriptors: (*Varactor diodes, Manufacturing methods), (*Manufacturing methods, Varactor diodes), Production, Microwave equipment, Silicon, Diffussion, Glass Ceramic materials, Welding.

Efforts were continued on the establishment of a capability to mass-produce a variable capacitance microwave diode. This diode, known as a varactor diode, is a silicon diffused mesa device. Three different package-style varactor diodes were manufactured. Manufacturing operations, flow charts and yield figures are presented. A description of manufacturing operations is given for each type. (Author)

AD-434 658 Div. 8
OTS price $10.10

Aeronautical Electronics and Electrical Lab., Naval Air Development Center, Johnsville, Pa.
DEVELOPMENT OF FUNCTIONAL DESCRIPTIONS FOR SIX PREFERRED MICROELECTRONIC ASSEMBLIES.
Phase rept.
by J. Namaroff. 12 Feb 64, 128p.
NADC EZ 6403 Unclassified report

Descriptors: (*Microminiaturization (Electronics), Circuits), Standards, Integrated circuits, Specifications, Military requirements, Electrical properties, Handbooks.

The final engineering report (appendix A) contains a handbook with descriptions for six microelectronic functions. These circuits are not specified in terms of individually recognizable component parts, but are described in terms of the electrical outputs resulting from specific electrical inputs operating from energy supplies under prescribed conditions. A research and development recommendation report (intended only for NAVAIRDEVCEN and BUWEPS use) developed from the studies, discusses the amenability to microminiaturization of the preferred circuits contained in NAVWEPS 16-1-519-2 Handbook and Supplement No. 1. (Author)

AD-434 674 Div. 8
OTS price $6.60

Georgia Inst. of Tech., Engineering Experiment Station, Atlanta.
QUARTZ CRYSTAL AGING EFFECTS.

Quarterly rept. no. 3, 15 Aug-15 Nov 63,
by R. B. Belser, W. H. Hicklin and R. A. Young.
15 Nov 63, 63p.
Contract DA36 039AMC02251E, Proj. 1G6
22 001A058 01 07
Unclassified report

Descriptors: (*Quartz, Single crystals), (*Quartz resonators, Reliability), (*Aging (Materials), Measurement), Low frequency, X-ray diffraction analysis, Capacitance bridges, Quartz capacitors, Radiation effects.

Aging measurements were conducted on approximately 246 quartz resonators of various types. Of 96 low frequency (100 Kc, 250 Kc, 455 Kc, and 500 Kc) resonators only 84 were serviceable after 65 days. Aging rates were high, 5 to 10 ppm during the frst 30 days, but for the last 30 days of the period 68% exhibited aging <5pp10 to the 7th power/wk. The units from three different manufacturers behaved differently and no one manufacturer produced the best units in all categories. The 500 Kc resonators aged markedly less than units of other frequencies. (Author)

AD-434 680 Div. 8
OTS price $1.10

Centro Radioelettrico Sperimentale 'G Marconi' (Italy).
BACKSCATTER OF RADIO WAVES FROM GROUND AND SEA,
by I. Ranzi. 31 Jan 64, 10p.
Contract AF61 052 665
AFCRL 64 108 Unclassified report

Descriptors: (*Ionospheric propagation, Scattering), Radio waves, Radio transmission, Atmospheric sounding, Earth, Oceans.

The importance of the presence of the F2 irregularities in determining shape and intensity of the backscattered echoes, and its influence on the skip distance measurements by the backscatter technique, are put in evidence. It is shown that the backscatter sounding is a powerful means for the study of the distribution of the irregularities in a large zone around the sounding station. The results of a first series of riometer recordings on 31.5 Mc near Rome (Italy) are also reported. (Author)

AD-434 698 Div. 8, 25
OTS price $3.00

Cambridge Acoustical Associates, Inc., Mass.
MUTUAL AND SELF-RADIATION IMPEDANCES IN AN ARRAY OF FREE-FLOODING, COAXIAL, SPACED RING TRANSDUCERS,
by Miguel C. Junger. 16 Mar 64, 35p. Technical rept. no. U178 48
Contract Nonr2739 00, Task NR185 301
Unclassified report

Descriptors: (*Transducers, Electrical impedance), Integral equations, Mathematical models, Cylindrical bodies, Sonar, Vibration, Green's function.

Expressions are derived for the mutual and self-radiation impedances between the elements in an array of coaxial, free-flooding, axially spaced ring transducers undergoing axisymmetric, radial vibrations. Fluid circulation through the gaps between elements and around the array extremities is accounted for in a formulation of this problem which was presented in a recent study of single ''squirters.'' An integral equation is constructed which defines the unknown radial velocity distribution alpha(z) between elements and on the two semi-infinite cylindrical surfaces which bracket the array. It is shown that the radiation impedance is the sum of two components: (1) the impedance evaluated by means of the mathematical model originated by Robey, which assumes that the active array element is located on an infinite rigid cylindrical baffle, and (2) the impedance associated with the unknown velocity distribution alpha(z), which is therefore in the nature of a correction factor to Robey's impedance. Four methods are presented for obtaining the function alpha(z): a perturbation solution which can be used as the starting point in a more refined iteration-type solution, a finite-difference solution of the integral equation and finally a variational solution. (Author)

AD-434 700 Div. 8
OTS price $1.60

American Electronic Labs., Inc., Colmar, Pa.
VIDEO DETECTOR DIODES FOR COUNTERMEASURES EQUIPMENT.
Interim development rept. no. 3, 1 Dec-28 Feb 64.
31 Mar 64, 18p.
Contract NObsr89357, Proj. SS021001, Task 9030
Unclassified report

Descriptors: (*Diodes (Semiconductor), Video signals), (*Demodulators, Video signals), Electrical properties, Manufacturing methods, Diffusion, Processing, Fixed contacts, Configuration, Sensitivity, Electronic countermeasures, Epitaxial growth, Impurities, Arsenic, Boron, Silicon.

A description is given of the solid state design and development of high power video detector diodes. The relationships between the diode equivalent circuit parameters and the fabrication processes are discussed. Detailed information is given concerning the material preparation, the junction formation, the diffusion process, the application of ohmic contacts, the geometrical shaping with respect to the solid state process, and the packaging of the units. The improvements in sensitivity obtained are presented. (Author)

AD-434 734 Div. 8
OTS price $1.60

Electronics Research Lab., Montana State Coll., Bozeman.
A FORMAL THEORY OF GENERALIZED MULTIPLE-OUTPUT BINARY COMBINATIONAL SWITCHING NETWORKS.
Final rept.,
by William L. Kilmer. Dec 63, 16p.
Contract AF19 604 6619, Proj. 5632, Task 563202
AFCRL 64 7 Unclassified report

Descriptors: (*Switching circuits, Non-linear systems), (*Mathematical logic, switching circuits), Theory, Redundant components, Computer logic, Networks, Transients, Numerical analysis.

AD-434 747 Div. 8
OTS price $2.60

Microwave Associates, Inc., Burlington, Mass.
HIGH POWER SEMICONDUCTOR PHASE SHIFTING DEVICES.
Quarterly progress rept. no. 8, 1 Oct-30 Dec 63,
by Joseph F. White. Mar 64, 30p.
Contract NObsr87291, Proj. SR008 03 02, Task 9637
Unclassified report

Descriptors: (*Phase shifters, Semiconductor devices), (*Semiconductor devices, Phase

shifters), Diodes (Semiconductor), Standing wave ratios, Electrical properties, S band, Transmission lines, Mathematical analysis.

The general properties of the transmission phase shifter circuit mode are described, and analytic relationships are quoted which may be used for calculating phase shift and transmission match. A geometric description of both transmission phase states of the circuit is developed and used to define the accuracy of a convenient approximate formula for phase shift calculations. The results of an S-band experimental diode phase shifter yielding 0 to 22 degree phase shift in two 11 degree steps and having a peak RF burnout power capability of 37 kilowatts at 1 microsecond pulse length and 0.001 duty cycle are described in detail. (Author)

AD-434 759 Div. 8, 30
OTS price $4.60

Hazeltine Technical Development Center, Inc., Indianapolis, Ind.
BINARY-TO-VIDEO DATA CONVERTER.
Final rept.
Feb 64, 44p. Rept. no. 6146
Contract AF30 602 2856
RADC TDR63 427 Unclassified report

Report on System 473L.

Descriptors: (*Display system, Television converters), (*Computer logic, Video map matching), Television display systems, Design, Cathode ray tube screens, Optical scanning, Command and control systems.

A study was made of various techniques for a binary-to-video converter suitable for accepting binary information from a computer (or similar type of input) and producing a display on a TV raster. Information to be shown on the display included alpha-numerics, symbols, map data, and similar processed-data readout in the form used for command and control displays. It is concluded that a data converter system capable of storing a digital representation of entire TV rasters would provide the most satisfactory solution. Where a number of different display pictures are to be assembled for simultaneous viewing by different persons at different local areas, a common system with a magnetic drum which provides multiple outputs is recommended. Time sharing most of the common system elements will provide a substantial savings in overall cost. A feasibility model utilizing the data converter concept was built and delivered to Rome Air Development Center, Griffiss Air Force Base, Rome, New York. For economic reasons, a small size core memory was used in place of a full size magnetic drum for video data storage. (Author)

AD-434 762 Div. 8, 25
OTS price $5.60

Shockley Transistor Div., Clevite Transistor, Palo Alto, Calif.
FAILURE MECHANISMS IN SILICON SEMICONDUCTORS.
Quarterly rept. no. 3, 1 Sep-30 Nov 63,
by H. Queisser, W. Schroen and W. Hooper.
Mar 64, 55p.
Contract AF30 602 3016, Proj. 5519, Task 551902
RADC TDR64 6 Unclassified report

Descriptors: (*Semiconductors, Failure (Mechanics)), (*Failure (Mechanics), Semiconductors), (*Transistors, Reliability (Electronics)), Silicon, Surface properties, Temperature, Electric currents, Diffusion, Measurement, Electric potential, Electric fields.

The surface studies show that there is motion of charge horizontally on the oxide covering planar silicon junctions. There is insignificant dipole action and diffusion through the oxide under normal operating conditions of such devices. The high field of the junction space charge layer is not necessary for the observed effects. Relations of oxide contact potential and device parameter changes are described. Reverse V-I characteristics are changed strongly by surface charge, which is measured by the Kelvin vibrating-condenser method. The problem of lateral thermal instability in silicon power transistors and its relationship to the second breakdown phenomenon was investigated further. Emphasis was put on those transistors which exhibited second breakdown at spots initially showing no elevated temperatures. The pathology of the damage produced by current concentrations was studied in more detail. (Author)

AD-434 766 Div. 8, 17
OTS price $8.10

General Electric Co., Schenectady, N. Y.
INVESTIGATION OF VARIOUS ACTIVATOR REFRACTORY SUBSTRATE COMBINATIONS.
Final rept.,
by J. H. Affleck and W. T. Boyd. Mar 64, 89p.
Contract no. AF30 602 2947, Proj. 5573,
Task 557303
RADC TDR64 20 Unclassified report

Descriptors: (*Electron tubes, Microwave equipment), (*Cathodes (Electron tubes), Materials), Manufacturing methods, Powder metallurgy, Tungsten, Barium compounds, Silicates, Porous metals, Sintering, Hydrogen, Nickel, Calcium compounds, Carbonates, Zirconium compounds, Hydrides, Aluminates, Tantalum, Emissivity, Thermionic emission, Work functions, Measurement, Poisoning, Gases, Oxygen, Air, Argon.

A study was made of various thin film activator-refractory substrate combinations with emphasis on the determination of evaporation of the activator material under various temperature and operation conditions. The purpose of this program was twofold: (1) to determine the properties of new materials combinations capable of producing high emission density and long life from a thermionic cathode, and (2) to investigate the effects of various gases upon the thermionic emission. (Author)

AD-434 771 Div. 8
OTS price $4.60

Paris U. (France).
EXTRA LONG WAVES PROPAGATION WITH ROCKETS.
Final rept.,
by E. J. Vassy. 30 Dec 63, 49p.
Contract AF61 052 155
AFCRL 64 77 Unclassified report

Descriptors: (*Very low frequency, Electromagnetic waves), (*Electromagnetic waves, Very low frequency), (*Propagation, Very low frequency), Rockets, Measurements, Electromagnetic fields, Modulation, Earth, Magnetic fields, Test equipment (Electronics), Ionospheric propagation.

Measurements were made of the field of a 16.8 Kc transmitter at long distance (2200 Km) versus the height. The field disappears at the height of 110 km by day as well as by night. There is no modulation when the loop rotates with the rocket. The wave presents a dispersive effect depending on the Earth's magnetic field. (Author)

AD-434 781 Div. 8
OTS price $10.10

Research Lab. of Electronics, Mass. Inst. of Technology, Cambridge.
OPTIMUM NOISE PERFORMANCE OF MULTITERMINAL AMPLIFIERS,
by William D. Rummler. 1 Oct 63, 129p. TR 417
Contract DA36 039AMC03200E and Grant DA SIG36 039 61G14
Unclassified report

Descriptors: (*Amplifiers, Performance (Engineering)), (*Performance (Engineering), Signal-to-noise ratio), (*Signal-to-noise ratio, Amplifiers), Mathematical analysis, Optimization, Power, Linear systems, Gain, Electrical properties, Frequency, Broadband, Networks.

A measure is determined of the optimum noise performance of a linear multiterminal-pair amplifier. It is shown that the optimum noise performance, achieved by imbedding a multiterminal-pair source and a multiterminal-pair amplifier in an arbitrary lossless network, can also be achieved by imbedding the source in an arbitrary lossless network to reduce it to a one-terminal-pair source and then using it to drive an arbitrary lossless reduction of the amplifier. The optimization procedure is extended to multifrequency networks coupled in an arbitrary manner by a lossless nonlinear device that obeys the Manley-Rowe formulas. In this context, the optimum noise performance of an ideal (lossless) double-sideband parametric amplifier is examined for both the cases in which the noises in the two sidebands are uncorrelated and partially correlated. (Author)

AD-434 794 Div. 8
OTS price $6.60

IIT Research Inst., Chicago, Ill
STUDY OF COMPREHENSIVE FAILURE THEORY.
Interim rept. no 2, 1 Aug-5 Oct 63,
by M. E. Goldberg, A Horberg, H. A. Lauffenburger, D. W. Levinson and R. G. Stewart
Feb 64, 62p Rept no E6006 7
Contract AF30 602 3054, Proj 5519, Task 551902
RADC TDR64 11 Unclassified report

Descriptors: (*Resistors, Failure (Mechanics)), (*Thin films, Oxidation), (*Heat, Damage), Diodes, Performance (Engineering)

Deposited film resistors formed from Evanohm condensate were observed to oxidize during exposure to high temperature; thinner films are observed to be more susceptible to oxidation damage Oxidation does not occur by transfer of oxygen from the substrate to the metal film Evidence supporting the presence of a precipitation process was also obtained Oxidation kinetics were studied by depositing a film of the resistive material onto the surfaces of a quartz crystal and observing the change in frequency with time and temperature A qualitative reliability model for diodes is described This model facilitates the characterizing of failure mechanisms operative in these devices and is being used in studies of diffused junction diodes Particular applicable failure mechanisms are briefly reviewed Criteria for selection of a specific device are considered (Author)

AD-434 819 Div. 8, 30, 25, 24
OTS price $4.60

Ohio State U. Research Foundation, Columbus.
NONDESTRUCTIVE SYSTEM FOR INSPECTION OF FIBER GLASS REINFORCED PLASTIC MISSILE CASES AND OTHER STRUCTURAL MATERIALS.
Quarterly technical rept. no. 9, 29 June-28 Sep 63,
by Jay P. Mitchell and Robert C. McMaster. Nov 63, 45p.
Contract DA33 0190RD3670, Proj. 59332008
WAL TR142 5 2 8 Unclassified report

Descriptors: (*Non-destructive testing, Guided missile components), (*Television equipment, X rays), (*X rays, Camera tubes), (*Camera tubes, Television equipment), (*Guided missile components, Test equipment (Electronics)), Storage tubes, Brightness, Scanning, Performance (Engineering), Sensitivity, Resolution, Production.

The scan-converter image storage system, manufactured to project specifications, was delivered during this report period. Evaluation tests indicated that it greatly improved the contrast range of low-signal-level X-ray television images Tests indicated that the storage system could be utilized to display a continuous television X-ray image obtained by intermittent-scan operation of the television camera chain. A contrast sensitivity of 2% through 1/2-in. thick steel was visualized on the television monitor screen by using intermittent-scan operation of the television camera chain and the image storage system. Evaluation tests of experimental 2-in.-diam X-ray-sensitive television camera tubes indicated that one of the two tubes delivered to the project was operable. Performance tests of the good tube indicated that mesh detail of 200-mesh screen could be visualized and that an image enlargement of approximately 10X was obtainable with a 17-in. kinescope tube. Equipment was fabricated to make lag response tests of 1-in., X-ray-sensitive, camera tubes. (Author)

AD-434 826 Div. 8, 17, 30
OTS price $2.60

Cornell Aeronautical Lab Inc., Buffalo, N.Y.
HIGH TEMPERATURE ANTENNA INVESTIGATION AND DEVELOPMENT.
Quarterly interim engineering rept. no. 4,
by Godfrey F. Buranich. 31 Mar 64, 24p. Rept. no. UB 1807E4
Contract AF33 657 11100, Proj. 6278, Task 627802
Unclassified report

Descriptors: (*Antennas, High temperature research), Slot antennas, Dipole antennas, Spiral antennas, Helical antennas, Slot antennas, Tantalum, Niobium, Stainless steel, Electrical properties, Aluminum, S-band, Physical properties.

This report summarizes the investigations for developing antennas which are suitable for prolonged operation at a temperature of antennas was experimentally verified. Aluminum, stainless

steel and graphite ground planes were interchanged with no significant change in the antenna pattern gain. Stubs made of copper, tantalum, stainless steel, niobium, graphite and Boride Z - a material made of zirconium diboride and 10% molybdenum disilicide - were interchanged and these also produced no change in radiation pattern gain. Brass models of the stub and scimitar antennas have been made. Fabrication work is progressing on a niobium wave guide slot antenna and on helical antennas of stainless steel, nichrome and tantalum. Refractory materials and their available protective coatings are expected to be suitable for use up to 3000 F. Stainless steel and niobium stub antennas have been made. Radiation pattern gains of these assemblies have produced the same gain as that of the brass model. The model antennas will be housed within a concrete radome while undergoing high temperature tests. Radiation tests have been made through this radome and they have shown that satisfactory high temperature electrical tests of antennas can be made using such a radome. (Author)

AD-434 877 Div. 8, 30
OTS price $1.60

U. S. Army Engineer Research and Development Laboratories, Fort Belvoir, Va.
ON THE PROBLEM OF MEASURING BY MEANS OF ALTERATING CURRENT THE DIFFERENTIAL CAPACITANCE OF ELECTRODES AND THE RESISTANCE OF ELECTROCHEMICAL REACTIONS,
by V. L. Kheyfets, A. B. Sheynin, B. Ya. Krasil'shchik and Yu. V. Fisher. 28 Sep 61, 12p.
AERDL T 1716 Unclassified report

Descriptors: (*Capacitance, Electrodes), (*Electrodes, Electrolytes), (*Electrolytes, Electrodes), Electrical impedance, Alternating current, Resistance (Electrical), Frequency, Mathematical analysis, Measuring devices (Electrical and electronic).

AD-434 850 Div. 8
OTS price $31.00

IIT Research Inst., Chicago, Ill.
PROCEEDINGS OF THE NINTH TRI-SERVICE CONFERENCE ON ELECTROMAGNETIC COMPATIBILITY.
Oct 63, 796p.
Contract DA36 039sc89102
Unclassified report

Descriptors: (*Electromagnetic waves, Compatibility), (*Radiofrequency interference, Symposia), Electromagnetic shielding, Communication systems, Radio interferance, Research program administration, Radio signals, Mathematical prediction, Radio communication systems, Radio equipment, Radio jamming, Radio reception, Radio transmission, Detection, Analysis, Design, Transmission lines, Attennation, Ground (Electrical), Signal-to-noise ratio, Pulse compression, Antenna, Radiation patterns, Digital computers, Radiofrequency cables, Radio transmitters, Radio receivers, Mobile, Search radar, Noise (Radio).

AD-434 908 Div. 8
OTS price $3.60

Radio Corp. of America, Lancaster, Pa.
RESEARCH STUDIES ON THERMIONIC CONVERTERS, EMITTER SHELL PHASE.
Quarterly technical rept. no. 2, 1 Oct 63-31 Dec 63,
by G. Y. Eastman. Jan 64, 36p.
Contract DA36 039AMC03197E, Task 1G6 22001A055 02
Unclassified report

Descriptors: (*Thermionic converters, Scientific research), (*Scientific research, Thermionic converters), High-temperature research, Materials, Protective coverings, Test methods, Structural shells.

This study concentrated on the permeation evaluation of sample materials and the design of the converter. Sample materials were received and after a preliminary examination were evaluated for permeation. The mathematics of the investigation were reviewed and refined to assure accurate analyses. Testing techniques were developed. A control sample of molybdenum was evaluated to verify permeation rates of other investigators and the sensitivity of the equipment was established. Hydrogen permeation rates for four sample materials were determined, and, although hydrogen permeation does take place, it is at levels that can be controlled by known sorption and gettering processes. A converter for use with fossil fuel was developed employing materials compatible with cesium and designed to permit the substitution of the emitter barrier with material determined optimum by the evaluation program. (Author)

AD-434 910 Div. 8, 30
OTS price $3.60

Tennessee U. Engineering Experiment Station, Knoxville.
AN INVESTIGATION OF THE PERFORMANCE OF A STEERABLE MULTIPLICATIVE CIRCULAR ANTENNA ARRAY USING ANALOGUE TECHNIQUES,
by C. L. Moulton, J. D. Tillman and H. P. Neff.
1 Jan 64, 32p. Rept. no. SR6
Contract AF19 628 288, Proj. 4600, Task 460002
AFCRL 64 5 Unclassified report

Descriptors: (*Antennas, Antenna configurations), (*Antenna configurations, Antennas), Performance (Engineering), Scanning, Antenna radiation patterns, Analog systems, Nonlinear systems, Mathematical analysis, Modulators, Noise (Radio), Detection, Signal-to-noise ratio, Direction finding, Antenna lobes.

This report describes a method by which a circular receiving array can be used as a non-linear multiplicative array. The advantage of the circular geometry is the same for this application as for the other uses studied previously: the beam can be pointed in any direction without significant change in the pattern. A balanced modulator is used as the multiplying element. A method of simulating a circular array is described, and this analog is used to obtain data on the performance of the multiplicative array. (Author)

AD-434 967 Div. 8, 30
OTS price $1.60

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
DIAGRAM OF AUTOMATIC COMPENSATION OF DRIFT OF ZERO IN ELECTROMETRIC AMPLIFIERS AND ITS ANALYSIS,
by D. E. Polonnikov. 19 Jul 63, 13p.
FTD MT63 47 Unclassified report

Trans. from Russian Periodical, Avtomatika I Telemekhanika, 23:12, pp. 1669-1674, 1962.

Descriptors: (*Amplifiers, Stabilization), Measurement, Electric currents, Stabilization systems, Automatic, Analysis.

A circuit is presented for the automatic compensation of drift of zero in electometric amplifiers used to measure small slowly changing currents. (Author)

AD-435 094 Div. 8
OTS price $1.60

Radio Observatory, Calif. Inst. of Tech., Pasadena.
ON THE LINEAR POLARIZATION OF THE RADIATION FROM RADIO SOURCES,
by G. A. Seielstad, D. Morris and V. Radhakrishnan. 1964, 17p.
Contract Nonr22019
Unclassified report

Descriptors: (*Microwaves, Tables), (*Polarization, Experimental data), Measurements, Magnetic fields, Emissivity.

By combining all available data, information on the polarization characteristics of about 30 sources is summarized in a table. Source designation and its position in Galactic coordinates, the polarization properties of the sources, and other source properties which are of interest when discussing their linear polarization are tabulated. (Author)

AD-435 095 Div. 8
OTS price $5.60

Marquardt Corp., Van Nuys, Calif.
PERFORMANCE OF RADIATION-RESISTANCE MAGNETIC AMPLIFIER CONTROLS UNDER FAST NEUTRON AND GAMMA IRRADIATION.
Preliminary rept., June-Aug 61,
by R. Sherwin and J. Montner. 30 Aug 61, 59p.
Rept. no. S222
Contract AF33 616 7857
Unclassified report

Descriptors: (*Magnetic amplifiers, Radiation effects), (*Radiation effects, Magnetic amplifiers), Performance (Engineering), Electromagnetic waves, Fast neutrons, Gamma rays, Diodes, Degradation, Neutron flux, Circuits.

This report describes the results of subjecting three amplifier designs and a magnetic voltage reference to nuclear radiation under constant temperature conditions. The circuits were specially designed to tolerate gross degradation in diode reverse impedance characteristics. These circuits were designed with diodes shunted by resistors so as to operate with precision to a point where radiation damage could cause diode reverse leakage to increase by a factor of five hundred. Results indicate that amplifiers did retain their precision performance until diode leakage did actually degrade by a factor of five hundred. The best amplifier showed no significant change in gain, linearity, frequency response, or tolerance to power supply variations until after the integrated flux level exceeded 2 x 10 to the 15th power nvt. (Author)

AD-435 097 Div. 8
OTS price $2.60

Motorola, Inc., Phoenix, Ariz.
PRODUCTION ENGINEERING MEASURE, STEP 1, ON 400 Mc, 300 mW POWER TRANSISTOR.
Quarterly rept. no. 10, 23 Sep-23 Dec 63,
by Richard A. Jacobs, J. L. Lemons and J. C. Haenichen. 23 Dec 63, 22p.
Contract DA36 039sc85975
Unclassified report

Descriptors: (*Transistors, Germanium), Specifications, Design, Processing, Electrical properties, Tests, Electronic equipment, Production control.

9. FLUID MECHANICS

AD-433 483 Div. 9
OTS price $1.10

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
BOUNDARY LAYER WITH PRESSURE GRADIENT IN COMPRESSIBLE FLUID FLOW,
by V. Ya. Shkadov. 31 Jan 64, 9p.
FTD TT63 1138 Unclassified report

Trans. from Izvestiya Akademii Nauk SSSR, Otdeleniye Tekhnicheskikh Nauk, Mekhanika i Mashinostroyeniye, No. 2, pp. 28-32, 1963.

Descriptors: (*Fluid flow, Compressible flow), (*Boundary layer, Pressure), Viscosity, Temperature, Laminar boundary layer, Partial differential equations.

AD-433 538 Div. 9
OTS price $1.60

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
DETERMINING THE AERODYNAMIC FORCES ACTING ON BODIES WITH FRONTAL DISRUPTION ZONE IN HYPERSONIC FLOWS,
by V. G. Bukovshin and G. I. Taganov 30 Jan 64, 12p.
FTD TT63 1206 Unclassified report

Trans. from Inzhenernyy Zhurnal, 3:2, pp. 215-221, 1963.

Descriptors: (*Conical bodies, Hypersonic flows), (*Spheres, Hypersonic flow), Spikes, Hypersonic characteristics, Aerodynamic loading, Pressure, Mathematical analysis, Lift, Drag.

AD-433 542 Div. 9, 12
OTS price $6.60

Office of Research Analyses, Holloman AFB, N. Mex.
DYNAMICS OF SEPARATING BODIES. VOLUME III. MEASUREMENTS AT MACH 8,
by R. D. Turner. Nov 63, 61p.
Contract AF29 600 1711, Proj. 7856, Task 78548
ORA 63 13 Unclassified report

Descriptors: (*Space capsules, Model tests), Wind tunnel models, Hypersonic characteristics, Test methods, Wake, Penetration, Performance (Engineering), Schlieren photography, Boundary layer, Aerodynamic characteristics, Ejection, Angle of attack, Interference, Conical bodies, Cylindrical bodies, Flared afterbodies.

Additional wind tunnel tests at a Mach number of 8, which supplement Mach 2, 4 and 5 tests reported in Volume II on a data capsule shape in an interference flow field of a carrier vehicle were conducted. The data obtained were analyzed and a preliminary evaluation was made as to the agreement with methods of prediction for both the Mach 8 tests and previous reported tests. It is shown that where the interference flow field is reasonably predicted, estimated values of a capsule's derivatives obtained with relatively simple calculation techniques agree reasonably well with the data. (Author)

AD-433 581 Div. 9
OTS price $1.10

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
TURBULENT BOUNDARY LAYER ON AN AXISYMMETRICAL BODY RAPIDLY REVOLVING IN AN AXIAL FLOW,
by L. A. Dorfman. 10 Feb 64, 9p.
FTD TT63 1137 Unclassified report

Trans. from Izvestiya Akademii Nauk SSSR, Otdeleniye Tekhnicheskikh Nauk, Mekhanika i Mashinostroyeniye, no. 4, pp. 18-22, 1962.

Descriptors: (*Axially symmetric flow, Turbulent boundary layer), Bodies of revolution, Axial flow turbine rotors, Fluid flow, Viscosity, Friction, Velocity, Differential equations, Partial differential equations.

AD-433 619 Div. 9
OTS price $3.50

Grumman Aircraft Engineering Corp., Bethpage, N. Y.
PRESSURE MEASUREMENTS FOR MACH FIVE FLOWS OVER WINGED RE-ENTRY CONFIGURATIONS WITH AERODYNAMIC CONTROLS. PART II. CONICAL CABIN CONFIGURATION,
by Louis G. Kaufman II. Feb 64, 210p.
Contract AF33 616 8130, Proj. 8219, Task 821902
RTD TDR63 4179, pt. 2 Unclassified report

Descriptors: (*Reentry vehicles, Aerodynamic configurations), Boost-glide vehicles, Hypersonic characteristics, Spacecraft cabins, Conical bodies, Pressure, Measurement, Cylindrical bodies, Angle of attack, Aerodynamic control surfaces, Model tests, Data, Airplane noses, Fins, Spoilers, Flaps, Deflection, Aerodynamic loading.

Pressure data were obtained for Mach five flows over winged re-entry configurations composed of cylindrical cabins mounted on a 60 degree sweepback delta wing with a cylindrical leading edge, clipped tips, and trailing edge flaps. The model was tested with spherical and conical fronts on the cabin, with and without tip fins, and with and without a trailing edge spoiler. Flap deflections were varied from -40 to +40 degrees and the model was pitched at angles of attack from -30 to +45 degrees for a free stream Reynolds number, based on model length of 3,575,000. (Author)

AD-433 736 Div. 9, 25
OTS price $2.60

Aeronautical Research Associates of Princeton, N. J.
EXAMINATION OF THE SOLUTIONS OF THE NAVIER-STOKES EQUATIONS FOR A CLASS OF THREE DIMENSIONAL VORTICES. PART III: TEMPERATURE DISTRIBUTIONS FOR STEADY MOTION,
by Coleman duP. Donaldson and Roger D. Sullivan. Nov Nov 63, 28p. Rept. no. 51
Contract AF49 638 255
AFOSR TN60 1227 Unclassified report

Descriptors: (*Partial differential equations, Incompressible flow), (*Incompressible flow, Gas flow), Vortices, Thermal conductivity, Reynolds number, Temperature.

The temperature distributions that occur inside a steadily rotated cylindrical vortex tube with porous walls having steady radial inflow of an

essentially incompressible fluid are obtained. The nature of the distributions for both liquids and gases is discussed. The results are compared with Rott's results for Burgers' unbounded vortex. (Author)

AD-433 737 Div. 9
OTS price $1.25

Cornell Aeronautical Lab., Inc., Buffalo, N. Y.
RESEARCH ON HYPERSONIC FLOW.
Rept. no. 3 (Final), 15 Dec 60-15 Dec 63,
by H. F. Waldron, C. E. Wittliff and M. R. Wilson. Feb 64, 39p.
Contract AF33 616 7812, Proj. 7064
ARL 64 27 Unclassified report

Report on Aerothermodynamic Investigations in High Speed Flow.

Descriptors: (*Hypersonic flow, Reviews), Blunt bodies, Cylindrical bodies, Conical bodies, Superaerodynamics.

Research conducted during the period 15 December 1960 to 15 December 1963 is summarized. The theoretical and experimental investigations have been concerned with three aspects of hypersonic flow; namely, rarefied hypersonic flow about blunt axisymmetric bodies, about cylinders normal to and inclined to the free stream, and higher Reynolds number flows about pointed cones. Except for the experimental data obtained for high Reynolds number flows about pointed cones, all the research discussed in this summary report has been previously published or is in the process of publication. (Author)

AD-433 738 Div. 9
OTS price $2.60

Davidson Lab., Stevens Inst. of Tech., Hoboken, N.J.
EFFECT OF SPEED AND WAVE HEIGHT ON THE ROLLING OF A SHIP MODEL WITH PASSIVE ANTI-ROLLING TANKS,
by Petros A. Lalangas. Mar 64, 23p. Rept. no. LR1018
Contract NObs84796, D.L. Proj. MR2488 222
Unclassified report

Descriptors: (*Oscillation, Damping), (*Ships (Non-military), Roll), Hydrodynamics, Stability, Water waves, Velocity, Models (Simulations), Measurement, Insrumentation, Fluid mechanics.

This report presents an experimental study on the effect of wave height and forward speed on the rolling response of the AGOR ship model unstabilized and stabilized with passive tanks in regular beam seas. The effect of speed on the roll damping and natural period was also examined. It was found that an increase in wave height shifts the peak of the unstabilized roll response to slightly lower frequencies and that an increase in speed has almost no effect on the natural roll period but decreases unstabilized roll amplitudes and increases stabilized roll amplitudes. (Author)

AD-433 790 Div. 9
OTS price $7.60

Institute of Engineering Research U. of Calif., Berkeley.
HEAVING FORCES AND PITCHING MOMENTS ON A SEMI-SUBMERGED AND RESTRAINED PROLATE SPHEROID PROCEEDING IN REGULAR HEAD WAVES,
by Choung Mook Lee. Jan 64, 79p. Rept. no. NA64 2
Contract Nonr22293, Proj. S R009 01 01
Unclassified report

Descriptors: (*Hydrodynamics, Water waves), (*Towed bodies, Fluid mechanics), Pitch (Motion), Moments, Pressure, Theory, Instrumentation, Dynamometers, Mathematical prediction, Measurement.

This report describes experiments in which heaving forces and pitching moments were measured on a semi-submerged and restrained prolate spheroid which was towed at a constant speed in regular head waves. By measuring the pressures on the wetted surface of the model and integrating these around each section, longitudinal distributions of vertical force were obtained for different wave lengths and speeds of advance. The total force and moment as obtained by integration of pressure over the wetted surface were compared with direct total force and moment measurements. The present work demonstrates the feasibility of investigating local hydrodynamic forces on small three-dimensional bodies by the use of miniature pressure gages. (Author)

AD-433 793 Div. 9
OTS price $3.60

Davidson Lab., Stevens Inst. of Tech., Hoboken, N. J.
APPLICATION OF LINEAR SUPERPOSITION TECHNIQUES TO THE ROLL RESPONSE OF A SHIP MODEL IN IRREGULAR BEAM SEAS,
by Petros A. Lalangas. Mar 64, 38p. Rept. no. 983
Contract Nonr26321, Proj. KA2554 024
Unclassified report

Descriptors: (*Ships (Nonmilitary), Roll), (*Hydrodynamics, Linear systems), Water waves, Theory, Models (Simulations), Instrumentation, Statistical analysis, Oscillation.

This report presents experimental results on the roll response of a Series-60, 0.60 block coefficient ship model in long-crested irregular beam waves with significant heights of 1.3 to 4.3% of the model length. Model speed was varied from zero to that corresponding to a Froude number of 0.158. Roll transfer functions derived from the measured roll and wave spectra as determined by linear superposition techniques are compared, to study the linearity of roll response. Measurements of the roll-damping in calm water, for the same speed range, are presented. The effect of speed on the magnitude and linearity of roll-damping is also examined. It is concluded that the principle of linear superposition can be used with reasonable engineering confidence in studying the roll response of fast cargo ships under way in moderate to severe seas. (Author)

AD-433 818 Div. 9
OTS price $9.60

Aerophysics Lab., Mass. Inst. of Tech., Cambridge.
SEPARATED FLOW ABOUT LIFTING BODIES.
Final rept.,
by Leon H. Schindel. Sep 63, 113p. Technical rept. no. 80
Contract N600 19 58559
Unclassified report

Descriptors: (*Vortices, Separation), Cylindrical bodies, Three-dimensional flow, Lift, Two-dimensional flow, Slender bodies.

A review and analysis of available information concerning the phenomenon of vortex separation on lifting bodies leads to the following conclusions: (1) the flow over a lifting three-dimensional body is analogous to a time-varying two-dimensional flow; (2) satisfactory methods are available for computing the time-varying separated flow about an impulsively started cylinder provided the angular vortex separation points are known; (3) the vortex separation points are determined primarily by the stability of the nonviscous flow; and (4) for practical calculations, the location of vortex separation may be assumed constant in time, and hence the steady-state values may be used. (Author)

AD-433 880 Div. 9
OTS price $2.60

Mathematics Research Center, U. of Wisconsin, Madison.
AN EXACT ANALYSIS OF LAMINAR FLOW IN THE ENTRANCE REGION OF AN ANNULAR PIPE,
by R. Manohar. Jan 64, 21p. Technical summary rept. 447
Contract DA11 022ORD2059
Unclassified report

Descriptors: (*Laminar flow, Numerical analysis), (*Pipes, Incompressible flow), Fluid flow, Nonlinear differential equations, Pressure, Velocity.

Nonlinear equations of laminar flow of a viscous incompressible fluid in the entrance region of an annular-pipe have been solved by an exact method. It is assumed that the velocity of the fluid is uniform at the entrance section. Velocity profiles, pressure distribution and inlet lengths have been obtained for various values of the ratio of inner and outer radii of the pipe. (Author)

AD-433 917 Div. 9
OTS price $2.60

Space Sciences Lab., General Electric Co., Philadelphia, Pa.
A THEORY OF HYPERSONIC LAMINAR AND TURBULENT VISCOUS WAKES AT CHEMICAL EQUILIBRIUM,
by K. S. Wen. Dec 63, 28p. Rept. no. R63SD01
Unclassified report

Descriptors: (*Wake, Hypersonic characteristics), Base flow, Laminar flow, Turbulence, Conical bodies, Theory, Axially symmetric flow, Shock waves, Stagnation point, Viscosity.

An analysis of laminar and turbulent viscous wake is presented for a body at hypersonic speeds. The Lewis number is assumed to be one, but the Prandtl number is left arbitrary but constant. The gas is considered in chemical equilibrium. The flow in the base region is treated first, starting with the free expansion at the base of the body and considering the subsequent mixing of the flow from the initial finite boundary layer with the external inviscid flow and the dead air confined near the base. The development of the viscous core within the inviscid wake from the base flow into the near and far wake regions is then investigated. The present theory can be applied to both blunt and slender bodies. Preliminary results of the temperature and velocity profiles for a 10 degree cone at hypersonic conditions are given. (Author)

AD-433 952 Div. 9, 31
OTS price $2.60

David Taylor Model Basin, Washinton, D.C.
POWER PREDICTIONS FOR A VEHICLE CARGO SHIP (T-LSV-RO/RO) REPRESENTED BY MODEL 4937,
by A. H. Weaver, Jr. and E. N. Hubble. Feb 64, 29p.
DTMB 1750 Unclassified report

Descriptors: (*Ships (Nonmilitary), Propulsion), (*Propulsion, Ships (Nonmilitary)), Ship hulls, Propellers (Marine), Tests, Design, Models (Simulations), Velocity, Hydrodynamics, Taylor's series.

TMB Model 4937 was constructed to represent a vehicle cargo ship (T-LSV-RO/RO). Model experiments were conducted to predict powering characteristics, bilge keel orientation, strut twist angles, and velocity survey in way of propeller. The Taylor ratio curve indicates this hull was abot 3 percent better than Taylor's at the design speed-length ratio of 0.877. This hull can attain the design speed of 20 knots with prototypes of the stock propellers absorbing 14,220 shp at 117 rpm. (Author)

AD-433 976 Div. 9
OTS price $3.60

Therm Inc., Ithaca, N.Y.
THE GENERALIZED ACTUATOR DISK,
by G.R. Hough and D.E. Ordway. Jan 64, 38p.
Rept. no. TR6401
Contract Nonr2859 00
Unclassified report

Descriptors: (*Propellers (Aerial), Mathematical models), (*Propellers (Marine), Mathematical models), Propeller blades, Fourier analysis, Vortices, Velocity, Theory, Shrouded propellers, Special functions, Loading (Mechanics), Aerodynamic loading.

Based upon the classical vortex system representation the induced velocities of a finite-bladed propeller with arbitrary circulation distribution are derived and Fourier analyzed. The zeroth harmonic, or steady component, of the induced velocities is considered in detail and formulas involving only an integration over the blade radius are found. Sample calculations of both the axial and radial velocity components for an arbitrary representative circulation distribution closely approximating the Goldstein optimum are presented. For the special case of a uniformly loaded propeller, exprressions for the induced velocity components are given in simple closed form and velocity profiles are compared with the representative results. (Author)

AD-434 258 Div. 9
OTS price $4.60

Grumman Aircraft Engineering Corp., Bethpage, N. Y.
HYDROFOIL FLUTTER SMALL SWEEP ANGLE INVESTIGATION.
Final rept.,

by Charles E. Squires, Jr. Nov 63, 42p.
Rept. no. DA Nonr3989 3
Contract Nonr 3989 00
Unclassified report

Descriptors: (*Flutter, Hydrofoils), Analysis, Design, Instrumentation, Test methods, Vibration, Construction.

Analytical and experimental studies have been performed which define the general behavior of hydrofoil struts for low sweep angles (0 degrees to 10 degrees). It is shown that in general the flutter frequency drops smoothly with decreasing sweep angle and becomes exactly zero at the intersection of the flutter and static divergence boundaries. Therefore, contrary to previous speculation, no flutter-free range of sweep angles exists immediately above the static divergence boundary. Possible exceptional cases are discussed and the affects of span length, frequency ratio, and elastic axis location are briefly examined. The significance of current design trends and a flutter analysis of a typical design are discussed. (Author)

AD-434 563 Div. 9, 31
OTS price $17.00

Massachusetts Inst. of Tech., Cambridge.
THE ANALYTICAL PREDICTION OF SHIP PERFORMANCE IN RANDOM SEAS, INCLUDING A NEW CORRELATION OF THEORETICAL AND EXPERIMENTAL MODEL MOTIONS IN REGULAR WAVES,
by Lyssimachos Vassilopoulos. Feb 64, 269p.
Contract Nonr3963 01, Proj. SR009 01 01
Unclassified report

Descriptors: (*Ships, Motion), Programming (Computers), Tables, Ocean waves, Pitch (Motion), Acceleration, Velocity, Theory, Hydrodynamics, Mathematical models, Ship models, Tests, Mathematical prediction.

To determine the feasibility of evaluating seaworthiness performance along analytical lines, a systematic comparison is first made of experimentally measured and theoretically computed ship motions and phase angles. Tank data for a broad range of Series 60 models in regular waves are extracted from N.S.M.B. publications and correlated with model responses calculated by a digital computer program which is based on the Korvin-Kroukovsky linear theory of ship motions in conjunction with Grim's latest results on added mass and damping. Both directly ahead and astern seas are considered and emphasis is paid to the effects of variations of hull from parameters and weight distribution. It is concluded that with minor exceptions there is satisfactory correlation between the analytical and experimental results and recommendations towards further improvement are subsequently presented. An attempt is next made to formulate kinematical seaworthiness on a rational basis. To this end, the importance of pitching, vertical acceleration, slamming, wetness and propeller emergence is discussed. It is then shown how the above ship responses and seaworthiness phenomena can be analyzed and hence assessed on the basis of simple statistical parameters and criteria. (Author)

AD-434 717 Div. 9
OTS price $8.60

Stanford U., Calif.
THE COMPRESSIBILITY EFFECT OF A GAS STREAM ON THE STABILITY OF AN ADJACENT LIQUID LAYER,
by I-Dee Chang and P. E. Russell. Dec 63, 100p.
SUDAER 172, TR10
Contract Nonr22530, Proj. NR064 425
Unclassified report

Descriptors: (*Gases, Compressive properties), (*Liquids, Stability), Compressive flow, Equations, Linear systems, Theory, Surface tension, Gravity, Configuration, Perturbation theory, Time, Motion, Density.

The interfacial stability of a liquid layer with a compressible gas flowing over it is investigated. The liquid is assumed to be incompressible and inviscid; the gas to be inviscid and to obey the equations of linearized compressible flow theory. The effects of surface tension at the gas-liquid interface and a gravitational body force are included. (Author)

AD-434 797 Div. 9, 30, 12
OTS price $8.00

Research and Technology Div., Air Force Systems Command, Washington, D. C.
PROCEEDINGS OF SYMPOSIUM ON AEROELASTIC AND DYNAMIC MODELING TECHNOLOGY, 23 24 25 SEPTEMBER 1963, DAYTON, OHIO.
Mar 64, 785p.
RTD TDR63 4197, pt. 1
Unclassified report

Descriptors: (*Wind tunnel models, Symposia), (*Aeroelasticity, Symposia), Aerothermoelasticity, Flutter, Buffeting, Thermal stresses, Simulation, Airframes, Aerodynamic loading, Spacecraft, Inflatable structures, Sloshing, Rotor blades, Transonic characteristics, Supersonic characteristics, Aircraft, Launch vehicles (Aerospace), Instrumentation, Photoelasticity, Vibration, Airplane models, Wind.

The unclassified proceedings of the Air Force Flight Dynamics Laboratory and Aerospace Industries Association Symposium on Aeroelastic and Dynamic Modeling Technology are presented. The papers are divided into appropriate technical area sub-groups and individual sessions were devoted to each. These sub-groups were: Theory and Design, Model Testing Techniques, Dynamic Loads and Aeroelastic Applications, and Structural Design Applications. Two classified sessions were held on Aerospace Vehicle Applications and Aircraft Applications. (Author)

AD-434 823 Div. 9
OTS price $2.60

Israel Inst. of Tech., (Haifa).
BASE PRESSURE BEHIND TWO-DIMENSIONAL AND AXIALLY SYMMETRIC BACKWARD FACING STEPS IN A TURBULENT SUPERSONIC FLOW,
by J. Rom and M. Victor. Dec 63, 30p. TAE Rept. no. 31; SR4
Contract AF61 052 576
ARL 64 67 Unclassified report

Descriptors: (*Supersonic flow, Seperation), (*Base flow, Pressure), Mathematical analysis, Two-dimensional flow, Turbulence, Axially symmetric flow, Wind tunnel models.

The pressure behind a two-dimensional step in supersonic turbulent flow is calculated by the use of the Crocco-Lees momentum integral method. However, instead of assuming a constant mixing rate of k=0.03, it is assumed that C, the average

value of turbulent mixing rate correlation function between separation and shock impingement positions, is constant. This assumption considers the turbulent mixing to be similar, in general, to the laminar case except for the much higher mixing rate. The assumption of C, as constant leads to a similarity parameter for the pressure behing a two-dimensional step equal to Re sub L to the minus 3/5 power times h/l. Pressure distribution behind two-dimensional steps is measured at Mach number of 2.25 and Reynolds numbers between 0.35 to 5x Re sub L to the minus 3/5 power times h/l. Good agreement is found between the analytical calculations and the experimental data as well as other published experimental data. Pressure distribution behind axially-symmetric backward facing steps is measured at Mach number 2.25 and Reynolds numbers of 3 to 10 to the 6th power. It is shown that the flow around the axially-symmetric step is similar to that about a free base and is the correlated using the parameter Re sub L to the minus 1/5 power times h/l. Comparison is presented also with published data and good agreement is found. (Author)

AD-434 841 Div. 9
OTS price $1.25

Aeronautical Systems Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
SUMMARY OF LAMINAR FLOW CONTROL TECHNIQUES FOR AIRCRAFT,
by Philip P. Antonatos, Joseph P. Nenni and Roland X. Mueller. Sep 63, 41p.
ASD TDR63 689 Unclassified report

Papers presented at the ASD 1963 Science and Engineering Symposium, held at Wright-Patterson AFB, Ohio., 18-19 Sep 63.

Descriptors: (*Boundary layer control systems, Suction slots), (*Laminar boundary layer, Aerodynamic characteristics), Airfoils, Friction, Drag, Boundary layer transition, Turbulent boundary layer, Two-dimensional flow, Stability, Three-dimensional flow, Swept wings, Area suction, Research planes, Wind tunnel models, Supersonic airfoils, Wings, Aerodynamic configurations, Design, Pressure, Gas turbines, Supersonic planes.

The promising results of the analytical investigation, wind tunnel and free flight experiments, and application studies of laminar flow control by means of suction are reviewed. From the first aerodynamic investigations that proved the existence of a viscous layer of fluid over a wing surface, it was shown that the penalty in terms of skin friction drag and resulting power requirements for cruise was a high percentage of the total drag of an aircraft. It became the ambition of all investigators to attempt efficient means of reducing the magnitude of this drag by at least preventing turbulent flow conditions from existing on the wing surfaces. With the advent of the jet engine it became possible to efficiently provide a means of suction to control the boundary layer on the surfaces that would offer practically no weight penalty. Further research showed the feasibility of using fine slots versus a distributed suction technique. (Author)

AD-434 952 Div. 9, 25
OTS price $1.60

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
APPROXIMATE CALCULATION OF THE DISTRIBUTION OF CURRENT DURING THE FLOW OF A CONDUCTING LIQUID THROUGH A CHANNEL IN A MAGNETIC FIELD,
by A. B. Vatazhin and S. A. Regirer. 17 Dec 63, 20p.
FTD MT63 8 Unclassified report

Trans. from Prikladnaya Matematika i Mekhanika, 26:3, pp. 548-556, 1962.

Descriptors: (*Electric currents, Magnetic fields), (*Magnetohydrodynamics, Fluid flow), Hall effect, Electrodes, Boundary value problems, Electrical conductance, Equations, Complex variables.

Certain questions related to the calculation of the spatial distribution of the electric current in a conducting medium moving through a channel in the presence of a magnetic field are treated. The necessity of formulating three-dimensional problems arose as a result of the impossibility of studying within the framework of one-dimensional theory such phenomena as, for example, the entry of an electrically conducting medium into a magnetic field and the effect of inhomogeneity of the boundary conditions on the perimeter of the cross section and along the channel. Three- dimensional problems must also be considered when studying the influence of the Hall effect. (Author)

AD-434 963 Div. 9
OTS price $1.60

Foreign Technology Div., Wright-Patterson AFB, Ohio.
CONCERNING THE INFLUENCE OF RADIATION HEAT EXCHANGE ON THE REMOVAL OF SUBSTANCE IN THE CRITICAL POINT OF A BLUNT-NOSED BODY,
by V. Ya. Neyland. 15 July 63, 12p.
DRS MT63 60 Unclassified report

Trans. from Inzhenernyy Zhurnal, 2:4, pp. 227-231, 1962.

Descriptors: (*Ablation, Blunt bodies), Heat transfer, Stagnation point, Thermal radiation, Enthalpy, Laminar boundary layer.

AD-434 965 Div. 9
OTS price $1.60

Foreign Technology Div., Wright-Patterson AFB, Ohio.
CONCERNING CERTAIN PECULIARITIES OF AVERAGING OF PARAMETERS IN A SUPERSONIC GAS FLOW,
by A. Ya. Cherkez. 15 July 63, 11p.
FTD MT63 51 Unclassified report

Trans. from Izvestiya AN SSSR, Otdeleniyi Tekhnicheskikh, Mekhanika I Mashinostroyeniye, no. 4, pp. 23-26, 1962.

Descriptors: (*Supersonic flow, One-dimensional flow), Statistical analysis, Pressure, Gas flow, Mathematical analysis.

AD-434 975 Div. 9
OTS price $1.60

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio
THE SOLUTION OF THE EQUATION FOR VON MISES' BOUNDARY LAYER THEORY,
by A. L. Dyshko 20 Nov 63, 13p.
FTD MT63 170 Unclassified report

Trans. from Vychislitel'naya Matematika, AN SSSR, Vol 7, pp. 181-186, 1961

Descriptors: (*Boundary layer, Theory), Hydrodynamics, Incompressible flow, Liquids, Differential equations, Difference equations, Operators (Mathematics), Inequalities

AD-434 976 Div. 9
OTS price $2.60

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
LAMINARY BOUNDARY LAYER ON A POROUS SURFACE,
by G. A. Kulonen. 5 Dec 63, 22p.
FTD MT63 168 Unclassified report

Trans from Vestnik Leningradskogo Universiteta, Seriya Matematiki Mekhaniki Astronomii, No 13, pp. 115-130, 1960.

Descriptors: (*Laminar boundary layer, Supersonic characteristics), Flat plate models, Surfaces, Porosity, Surface properties, Friction, Gas flow, Jets, Injection, Boundary layer control systems, Mathematical models, Temperature, Porous materials, Jet mixing flow.

The problem concerning the decrease of surface friction and the lowering of surface temperature by means of an injection of a small quantity of a gaseous substance onto a boundary layer according to a specific law is taken into consideration. The physical properties of the gaseous substance are nearly the same as those of the cooling agent exerts a great influence only on the flow of the gas in a thin layer next to the wall and does not introduce perturbations in the external potential flow Then the indicated problem can be analyzed within the framework of the boundary layer theory. (Author)

AD-434 977 Div. 9
OTS price $1 60

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
ON THE INFLUENCE OF VORTICITY OF EXTERNAL FLOW AND CURVATURE OF BODY ON FLOW IN BOUNDARY LAYER,
by I. V. Petukhov and A. L. Ankudinov 14 Jan 64, 15p
FTD MT63 167 Unclassified report

Trans from Inzhenernyy Zhurnal, Izdatel'stov AN SSSR, 2:4, pp 262-268, 1962

Descriptors: (*Laminar boundary layer, Vortices), Bodies of revolution, Aerodynamic configuration, Fluid flow, Viscosity, Gas flow, Theory, Partial differential equations, Mathematical analysis, Convex bodies.

A flow in a laminary boundary layer can be presented as the superposition of two flows: main and secondary. The secondary flow is stipulated by influence of such factors, as the curvature of the body surface and vorticity of the external, nonviscous flow Calculation of influence of these factors reduces to the determination of a small correction of the main solution. Below is given the strict statement of boundary conditions for secondary flows in a boundary layer. The approach to the corresponding problem is based on method of accurate joining of viscous and nonviscous flows, applied in an examination of the main flow. Thus, an external nonviscous flow and the surface of the body it flows around (surface of displacement) are considered to be given, at the time when changes in the form of body, caused by the presence of a viscous near-wall layer, are not known For the case corresponding to the flowing around of plate by a oblique flow, results are given of calculation of correction to solution of Blasius, caused by the vorticity of external flow (Author)

AD-434 990 Div. 9
OTS price $1.10

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
OSCILLATIONS OF A TWO-BAY PANEL IN GAS FLOW,
by Zh. K. Makhortykh. 5 Dec 63, 8p.
FTD MT63 143 Unclassified report

Trans. from Institut Mekhaniki, AN SSSR, Inzhenernyy Sbornik, Vol. 28, pp. 51-54, 1960.

Descriptors: (*Gases, Oscillation), Gas flow, Elasticity, Supersonic flow, Velocity, Pressure, Statics, Surfaces, Equations, Frequency, Stability, Theory, Fluid flow, Analysis.

AD-434 992 Div. 9
OTS price $1.60

Foreign Tech., Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
CERTAIN GENERALIZATIONS AND RESULTS OF INVESTIGATING THE THEORM OF REVERSIBILITY FOR A TRANSIENT MOTION,
by B. I. Ul'yanov. 6 Dec 63, 12p.
FTD MT63 140 Unclassified report

Descriptors: (*Fluid flow, Aerodynamic characteristics), (*Wind tunnel models, Motion), Wing-body configurations, Pressure, Integrals, Wings, Moments.

AD-434 994 Div. 9, 1
OTS price $1.60

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
INVESTIGATION OF COMPLEX NATURAL FREQUENCIES OF FLEXIBLE AIRCRAFT DEPENDING ON SPEED OF FLIGHT,
by V. B. Glasko and Yu. M. Romanovskiy. 19 Dec 63, 13p.
FTD MT63 133 Unclassified report

Trans. from Izvestiya AN SSSR, Otdeleniye Tekhnicheskikh Nauk, Mekhanika i Mashinostroeniye, No. 2, pp. 105-109, 1962, Moskva.

Descriptors: (*Aeroelasticity, Mathematical analysis), (*Airframes, Vibration), Flexible structures, Wings, Ailerons, Equations, Airspeed, Frequency.

AD-435 061 Div. 9
OTS price $8.10

Ordnance Research Lab., Pennsylvania State Univ., University Park.
A STUDY IN UNDERWATER FLUTTER,
by M. Sevik and C. T. Ackerman. 3 Jan 64, 81p.
Rept. no. TM504 2461 02
Contract NOw63 0209c
Unclassified report

Descriptors: (*Vehicles, Underwater), (*Underwater objects, Mathematical models), (*Flutter, Programming (Computers)), (*Aeroelasticity, Hydrofoils), Ellipsoids, Hulls (Marine), Control surfaces, Hydraulic models, Vibration, Motion.

The possibility of bending torsional flutter on a typical underwater vehicle has been analyzed theoretically. The mathematical model chosen consisted of a thin-walled ellipsoid of revolution and a control surface attached to its aft end. The first three bending modes of the hull and one torsional mode of the control surface have been included in the analysis. The onset of flutter has been calculated and the results have been presented in parametric form. In addition, certain water tunnel experiments performed on a hydroelastic model are reported. These gave an indication of the magnitude of spontaneous excitations of the control surface and the hull at velocities below the flutter speed. An estimate of the magnitude of these hydrodynamic disturbances is given. (Author)

AD-435 078 Div. 9
OTS price $4.60

Brown Engineering Co., Huntsville, Ala.
AN ITERATIVE METHOD FOR APPROXIMATING THE FLOW FIELD ABOUT A SUPERSONIC BLUNT BODY,
by Paul Nelson Jr., Oct 63, 45p. TN R72
Unclassified report

Descriptors: (*Blunt bodies, Supersonic characteristics), (*Supersonic flow, Blunt bodies), Mathematical analysis, Iterative methods, Spheres, Shock waves, Axially symmetric flow.

An iterative method is described for approximating the inviscid flow field about a supersonic axisymmetric blunt body. The unique feature of the method is the use of a shock condition as the key in obtaining successive approximations. The method is not particularly suitable for obtaining results in closed form, but should be reasonably convenient for numerical computation. An approximation to the flow of an ideal gas about a sphere is obtained by applying a similar method to an approximate set of flow equations. (Author)

10. FUELS AND COMBUSTION

AD-433 612 Div. 10
OTS price $3.60

Army Missile Command, Redstone Arsenal, Huntsville, Ala.
EFFECT OF FILLER CONCENTRATION ON THE VISCOELASTIC RESPONSE OF A COMPOSITE SOLID PROPELLANT,
by Donald L. Martin, Jr. 2 Mar 64, 39p.
Proj. 1B222901A205
AMC-RA RK TR64 2 Unclassified report

Descriptors: (*Solid rocket propellants, Solid rocket propellant binders), (*Solid rocket propellant binders, Mechanical properties), (*Elastomers, Solid rockt propellant binders), Acrylic resins, Butyl rubber, Reinforcing materials, Composite materials, Viscoelasticity, Stresses, Failure (Mechanics), Temperature, Mathematical analysis, Nomographs.

The mechanical properties of filled elastomers, in general, and of composite solid rocket propellants, in particular, are dependent on the volume fraction of filler, the viscoelastic properties of the binder, and the interaction between the binder and filler particles. An investigation was conducted to determine the effect of volume fraction of filler on the viscoelastic response of the PBAA propellant system. Formulations containing up to 84% filler fraction were investigated in uniaxial tension with strain rates varying from 0.05 to 5.0 in. per in. per minute and temperature of +180 F to -90 F. While the maximum stress, modulus, strain-energy-density at failure, and the stress-strain relationship were found to increase with addition of filler particles, a decrease was found in the strain at break. Empirical formulae were derived for the dependence of the filler fraction shift factor and the filler-induced strain concentration factor on filler fraction. Mechanical response spectrums are presented for maximum stress, modulus, strain, strain-energy-density at failure, and for the stress-strain relationship, indicating the dependence of these parameters on strain rate, temperature, and filler fraction. (Author)

AD-433 622 Div. 10
OTS price $1.10

Martin Marietta Corp., Baltimore, Md.
EVALUATION OF THE MECHANISM OF CORROSION IN CAPILLARIES. OXIDIZER DIFFUSION STUDIES.
Status rept. no. 1,
by P. J. Pizzolato and C. C. Fatino. 4 Mar 64, 9p. Rept. no. ME531
Unclassified report

Descriptors: (*Liquid rocket oxidizers, Storage), (*Propellant tanks, Corrosion), Porosity, Aluminum, Oxides, Nitrogen compounds, Nitric acid, Aluminum compounds, Nitrates.

AD-433 635 Div. 10
OTS price $1.60

Rohm and Haas Co., Huntsville, Ala.
ENGINEERING RESEARCH.
Quarterly progress rept.,
by Donald E. Mastin. 6 Mar 64, 20p. Rept. no. P63 27
Contract DA01 0210RD11878Z
Unclassified report

Descriptors: (*Solid rocket propellants, Thermal diffusion), Thermal conductivity, Surface temperature, Thermocouples, Mathematical models, Programming languages, Silicone plastics, Acrylic resins.

A method for the determination of the thermal diffusivity of solid propellants was developed based on the transient temperature response of a propellant specimen. The method is simple, accurate, and well suited to materials of low diffusivity. (Author)

AD-433 729 Div. 10
OTS price $4.60

Research and Technology Div., Air Force Systems Command, Edwards, Calif.
FEASIBILITY TESTING OF A NITROGEN-GENERATING SOLID CHARCH (SODIUM AZIDE) FOR PROPELLANT TANK PRESSURIZATION,
by David T. Clift. Aug 63, 43p.
RTD TDR63 1080 Unclassified report

Descriptors: (*Gas generating systems, Azides), (*Propellant grains, Gas generating systems), (*Azides, Gas generating systems), Liquid rocket propellants, Propellant tanks, Pneumatic systems, Sodium compounds, Pressure, Hydrazine, Tests, Exhaust gases.

The objective of this effort was to determine the feasibility of the Sodium Azide, Self Generating Gas Pressurization (SGGP) system as part of the Rocket Propulsion Laboratory's subsystems test program for high energy, storable propellants. A series of four tests was conducted on the system and in each test the system failed to function properly. In each instance, the malfunction of the system was attributed to failure of the grain. This particular grain formulation appears to be highly susceptible to the formation and propagation of cracks. In short, the Sodium Azide SGGP in its current state of development can not be considered a reliable propellant pressurant source. (Author)

AD-433 853 Div. 10
OTS price $1.60

Rocket Power Inc., Pasadena, Calif.
STUDY OF ROCKET ENGINE EXHAUST PRODUCTS.
Quarterly rept. no. 10, 1 Sep-30 Nov 63,
by M. A. Greenbaum, R. E. Yates, J. A. Blauer, M. Arshadi and H. C. Ko. 30 Nov 63, 14p.
Rept. no. QR7414 10
Contract AF04 611 7414
Unclassified report

Descriptors: (*Exhaust gases, Thermodynamics), (*Combustion products, Thermodynamics), Beryllium compounds, Hydroxides, Chemical reactions, Aluminum compounds, Fluorides, High-temperature research, Vacuum furnaces, Aluminum, Oxides, Combustion chamber gases.

The reaction of BeO(s) with H2O(g) is still under investigation between 1500-1760 K. Preliminary results from a study of the AlF3(g)-Al(1) reaction idicate that the heat of formation of AlF(g) is near the value reported in the JANAF Tables. Initial results obtained from a study of the BF3(g) - B(s) reaction indicate that BF(g) requires a temperature at least 300 K higher than predicted from the JANAF Tables to be formed from the indicated reaction. (Author)

AD-434 592 Div. 10
OTS price $2.60

Rocket Propulsion Labs., Air Force Systems Command, Edwards, Calif.
A COMPATIBILITY EVALUATION OF PLASTIC MEMBRANE FILTERS WITH LIQUID PROPELLANTS AND SOLVENTS,
by Robert A. Biggers. Feb 64, 27p.
RPL TDR64 38 Unclassified report

Descriptors: (*Membranes, Filters (Fluid)), (*Filters (Fluid), Membranes), (*Liquid rocket propellants, Filters (Fluid)), Hydrocarbons, Compatibility, Polyethylene plastics, Hydrazine, Methyl hydrazines, Nitrogen compounds, Tetroxides, Nitric acid, Hydrogen peroxide, Jet engine fuels, Liquid rocket fuels, Nitrates, Chloroform, Esters, Carbon tetrachloride, Alcohols, Ethers, Water, Organic solvents, Ketones, Gravimetric analysis, Particles, Contamination, Halogenated hydrocarbons, Chlorine compounds.

Data are presented to show the compatibility of polyethylene filter membranes with eleven propellants and eight solvents. More than 300 tests were conducted at ambient temperatures for periods up to 52 hours. The filters tested are satisfactory for use in gravimetric determination of particulate matter in most liquid propellants. (Author)

AD-434 966 Div. 10
OTS price $2.60

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
INTENSIFICATION OF HOMOGENEOUS COMBUSTION BY LOW-FREQUENCY OSCILLATIONS,
by B. M. Gunko and V. V. Solovev. 15 July 63, 28p.
FTD MT63 50 Unclassified report

Trans. from Instituta Goryuchikh Isokopayemyka, (Trudy), No. 18, 1962.

Descriptors: (*Combustion, Reaction kinetics), Combustion chambers, Oscillation, Turbulent flow, Burning rate, Stability.

11. GROUND TRANSPORTATION EQUIPMENT

AD-434 163 Div. 11
OTS price $12.50

Hygrodynamics, Inc., Silver Spring, Md.
MOTIONS OF TILT FLOAT VEHICLES IN WAVES,
by Roderick A. Barr and Milton Martin. Oct 63, 173p. Technical rept. 237 1
Contract N600 19 58363
Unclassified report

Descriptors: (*Amphibious vehicles, Motion), (*Ocean waves, Amphibious vehicles), Equations, Hydrodynamics, Floats, Moments, Pitch (Motion), Velocity, Configuration, Roll, Digital computers, Programming (Computers), Frequency.

The non-linear equations of motion for the heave, pitch (or roll) and surge (or sway) motion of a tilt-float supported amphibious vehicle drifting in a seaway are derived. These equations are programmed for an IBM 7090 electronic digital computer and the results of computations which show the effect of various parameters on the heave and pitch response to waves of all significant frequencies contained in a seaway are presented. The principal parameters investigated are the effects of the slenderness ratio of the floats, the vertical elevation of the c.g. of the vehicle, the radius of gyration of the vehicle, the cant angle of the floats, vertical and horizontal damping plates, the geometric arrangement of the floats and wave height (non-linear effect). (Author)

12. GUIDED MISSILES

AD-433 533 Div. 12
OTS price $1.10

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
FROM THE FIRST SATELLITE TO GROUP FLIGHT.
31 Dec 63, 9p.
FTD TT63 1081 Unclassified report

Division 12 - GUIDED MISSILES

Trans. from Sovetskaya Latviya, p. 2, 4 Oct 62.

Descriptors: (*Satellites (Artificial), Flight), Space flight, Space capsules, Research program administration.

AD-433 589 Div. 12, 9, 27, 7
OTS price $10.50

Sundstrand Aviation-Denver, Denver, Colo.
EFFECT OF REYNOLDS NUMBER ON TURBINE PERFORMANCE AT VARIOUS MACH NUMBERS.
Final rept.,
by Robert G. Adams and James E. Mullaney.
13 Mar 64, 133p. Rept. no. CDRD64 7032
Contract NOw61 0605c
Unclassified report

Descriptors: (*Turbines, Reentry vehicles), (*Reentry vehicles, Auxiliary power plants), Supersonic flow, Reynolds number, Transonic flow, Effectiveness, Turbine wheels, Axial-flow turbines, Gas turbines, Gas turbine nozzles, Turbine blades, Subsonic flow, Design, Gas turbine rotors, Gas turbine blades.

An analytical and experimental program was conducted to investigate the inter-relationship of Reynolds number (Re) and Mach number (Mn) effect (on the efficiency of axial impulse turbines) in the Re range of from 800 to 10,000 and the Mn range of from 1.15 to 3.0. The optimum pressure split of two-stage re-entry turbines operating in the Re and Mn ranges was determined. The performance potential of two-stage re-entry turbines was formulated. The Re effect on three-dimensional flow patterns such as occur in the Silvern tangential flow turbine was investigated. Preliminary trends of Re and Mn inter-relationship inherent in tangential flow turbines were determined.

AD-433 606 Div. 12
OTS price $3.60

Aerospace Communications and Controls Div, Radio Corp. of America, Burlington, Mass.
EARTH COVERAGE BY SATELLITE CONFIGURATIONS,
by Lawrence Norwood. Feb 64, 37p. Rept. no. TDR269 4304 7
Contract AF04 695 269
SSD TDR64 20 Unclassified report

Descriptors: (*Satellite networks, Optimization), (*Celestial mechanics, Satellite networks), Equations, Elliptical orbit trajectories, Aerial reconnaissance, Polar orbit trajectories, Synchronous satellites, Mathematical analysis.

The fundamental equations of orbital mechanics are stated, from which interrelationships among satellite altitude, speed, period, kinetic energy, potential energy, and field of view are derived analytically and depicted graphically. Attention is focused upon the northern hemisphere, and equations are derived which express the percentage of time that a satellite will view simultaneously all points north of a given latitude. Grazing incidence is assumed for mathematical convenience. Conclusions are drawn regarding the number of satellites required, as a function of altitude, to insure complete coverage of a polar cap or specific portion thereof, by one, two, or three orbital planes. Some consideration is given to orbital stability. It is demonstrated that the coverage afforded by elliptical orbits at critical inclination is superior to that provided by circular polar orbits. (Author)

AD-433 656 Div. 12
OTS price $7.60

Army Missile Command, Redstone Arsenal, Huntsville, Ala.
MATERIALS FOR RE-ENTRY. A SELECTED BIBLIOGRAPHY, 1959-1963,
by Vernon A. Nieberlein. 12 Mar 64, 75p.
Proj. 1A023301A110
AMC RA RR TR64 1 Unclassified report

Descriptors: (*Re-entry vehicles, Refractory materials), (*Refractory metals and alloys, Bibliography), (*Refractory materials, Bibliography), (*Bibliography, Refractory materials), Heat-resistant plastics, Ceramic materials, Cermets, Pyrolytic graphite, Heat-resistant metals and alloys, Heat shields, Cooling, Heat transfer, Ablation.

A selected bibliography covering the years 1959 through 1963 has been abstracted. Materials for re-entry, and closely related work on re-entry environment, materials requirements, and cooling mechanisms are included. The bibliography is indexed by subject and author. (Author)

AD-433 726 Div. 12, 30
OTS price $15.00

Office of the Secretary of Defense, Research and Engineeering, Washington, D. C.
SHOCK, VIBRATION AND ASSOCIATED ENVIRONMENTS. PART IV,
Mar 64, 230p. Bulletin no. 33
Unclassified report

The 33rd Symposium on Shock, Vibration and Associated Environments was held on 3-5 Dec 63, Washington, D. C.

Descriptors: (*Shock (Mechanics), Guided missiles), (*Vibration, Guided missiles), (*Guided missiles, Vibration), Acoustic impedance, Transportation, Vehicles, Shipborne, Airborne, Railroads, Spacecraft, Environmental tests, Launch vehicles (Aerospace), Guided missiles (Surface-to-surface), Guided missiles (Surface-to-air), Test facilities, Instrumentation, Guided missiles (Underwater-to-surface), Vibration isolators, Vibrators (Mechanical), Symposia, Ship hulls.

AD-433 753 Div. 12
OTS price $3.60

Aerospace Corp., Los Angeles, Calif.
A SYSTEMATIC APPROACH TO THE CHOICE OF STATION LOCATIONS FOR LOW-ALTITUDE SATELLITE TRACKING IN NEAR EQUATORIAL ORBITS,
by G.J. Bonelle. 10 Mar 64, 35p. Rept. no. TDR 269 4110 01 16
Contract AF04 695 269
SSD TDR64 27 Unclassified report

Descriptors: (*Satellites (Artifical), Tracking), (*Equatorial orbit trajectories, Tracking), Azimuth, Orbital trajectories, Satellite, Networks, Low altitude, Space surveillance systems, Geography.

This paper is primarily concerned with methods of choosing optimum locations for tracking stations which provide maximum support for satellites with near equatorial orbits. The method chosen makes use of the considerations that (a) the orbits ground traces are concentrated in the vicinity of the latitude equal to the maximum inclination of

the orbit and (b) most of the direct launchings possible from Cape Kennedy will have a very limited range of orbit inclinations; i.e., from 28 1/2 degrees to 34 1/2 degrees. The relative merits of the sites being considered using the above method are then tested using the following criteria: (a) that maximum number of tracking passes per day be supported, (b) that a minimum number of gaps exist in network coverage, (c) that stations provide early orbit support, and (d) that maximum support be given for recovery phases of satellite missions. Using the above method it is possible to select stations locations for a completely new network or to select a station or stations to provide greater support using existing networks. (Author)

AD-433 885 Div. 12
OTS price $3.60

Institute for Defense Analyses, Washington, D. C.
LARGE AMPLITUDE VIBRATION AND RESPONSE OF CURVED PANELS,
by Benjamin E. Cummings. Mar 63, 38p. Rept. no. HQ63 1346
Contract SD50
Unclassified report

Descriptors: (*Panels (Structural), Loading (Mechanics)), (*Structural shells, Stresses), Cylindrical bodies, Shock waves, Vibration, Buckling (Mechanics), Curved profiles, Equations, Mathematical analysis.

The dynamic nonlinear shallow-shell equations are examined in the special case of a cylindrical shell segment. Different developments are given for two systems: in System A, the stress boundary conditions are satisfied exactly and compatibility is satisfied on the average; in System B, compatibility is satisfied exactly and the stress boundary conditions are satisfied on the average. Perturbation and exact integral expressions are found for the frequencies of vibration. The response to delta-function, step-function and harmonic-function loading is examined. Dynamic buckling is predicted by shock response method. (Author)

AD-433 978 Div. 12
OTS price $1.60

Naval Weapons Lab., Dahlgren, Va.
CALIBRATION OF DOPPLER SATELLITE OBSERVATIONS BY SHORT ARC SOLUTION FOR STATION COORDINATES,
by E. H. Nott. 18 Mar 64, 17p.
NWL 1908 Unclassified report

Descriptors: (*Space surveillance systems, Instrumentation), Scientific satellites, Geodesics, Doppler systems, Calibration, Orbital trajectories, Least squares method.

This report presents the results obtained by using the short arc method to determine station coordinates for the purpose of calibrating the Doppler instrumentation used in determining geodetic parameters from satellite observations. The coordinates obtained were within three standard deviations of surveyed station coordinates in the majority of cases. Since this represented differences of five to ten meters, depending on the relative positions of the stations, when 24 arcs were combined, it is concluded that Doppler data processed by the short arc method give a reliable estimate of station positions. (Author)

AD-434 002 Div. 12
OTS price $1.60

Pacific Missile Range, Point Mugu, Calif.
A PRELIMINARY TOTAL COST MODEL FOR COMPARING RANGE SAFETY POLICIES WITH AN APPLICATION TO THE KWAJALEIN AREA,
by M. L. Eaton, L. A. Leake, C. E. Parker and C. E. Wisler. 31 Mar 64, 20p.
PMR TM64 5 Unclassified report

Descriptors: (*Guided missile ranges, Safety), Hazards, Mathematical models, Abort, Casualties, Costs, Geometry.

This report begins with the assumption that the total national cost of a range safety policy is a useful measure for comparing different safety policies. Using the situation of ICBM launches from Vandenberg Air Force Base into the Kwajalein Atoll, there is developed a model for determinivg expected numbers and costs of casualties, expected numbers and costs of casualties, expected number and cost of good missiles destroyed, and other factors entering into an over-all cost summation. With the model it is possible to determine the influence on tatal cost (or on its components) of changes in parameters of safety policies. The parameter changes possible include (1) altering the target point, (2) moving the impact limit lines, and (3) modifying or eliminating the range safety system (GERSIS). As far as is known, this is the first concerted effort to estimate hazards in areas protected by impact limit lines. (Author)

AD-434 076 Div. 12
OTS price $2.75

Cornell Aeronautical Lab. Inc., Buffalo, N. Y.
FIXED-BASE AND IN-FLIGHT SIMULATIONS OF LONGITUDINAL AND LATERAL-DIRECTIONAL HANDLING QUALITIES FOR PILOTED RE-ENTRY VEHICLES.
Final rept.,
by Edwin A. Kidd and Robert P. Harper, Jr..
Feb 64, 124p. Rept. no. TE 1516F1
Contracts AF33 616 5823; AF33 616 7753, Proj. 8219, Task 821905
ASD TDR61 362 Unclassified report

Descriptors: (*Reentry vehicles, Flight control systems), (*Boost-glide vehicles, Stabilization systems), Flight simulators, Aerodynamic configurations, Simulation, Psychomotor tests, Jet training planes, Manned spacecraft, Human engineering, Maneuverability, Lift, Handling, Roll, Pitch (Motion).

Longitudinal and lateral directional flying qualities for the re-entry mission are reported. The program utilized primarily a high-fidelity fixed-base ground simulator with evaluations made by three pilots. One of the three pilots also made in-flight evaluations of longitudinal flying qualities in the same vehicle, a three-axis variable stability airplane flown with a two-axis side controller and conventional rubber pedals. Control sensitivity evaluations were compared to center stick results of earlier work. The longitudinal flying qualities as evaluated both on the ground simulator and in flight are compared and related to earlier investigations. Pilot rating variability, both interpilot and intrapilot, are quantized and discussed for the ground and flight experiments. Performance measures are reported. (Author)

AD-434 165 Div. 12
OTS price $11.00

Naval Ordnance Lab., White Oak, Md.
POINT-MASS TRAJECTORY DATA FOR MANEUVERABLE BALLISTIC MISSILE RE-ENTRY VEHICLES,

Division 12 - GUIDED MISSILES

by Lawrence T. Brekka. Feb 64, 143p.
NOL TR63 193 Unclassified report

Descriptors: (*Reentry vehicles, Maneuverability), Trajectories, Digital computers, Penetration, Data, Guided missile trajectories, Terminal ballistics, Velocity, Lift, Drag, Flight paths.

A digital program was used to compute the point-mass trajectories of maneuverable ballistic missile re-entry vehicles. Lift-drag ratios from -2 to +2, ballistic coefficients from 100 to 3000 lb/sq. ft., re-entry velocities from 5000 to 25,000 ft/sec, re-entry angles from -15 degrees to -55 degrees, and bank angles from zero to 180 degrees were examined. The results are summarized in a series of curves. (Author)

AD-434 167 Div. 12
OTS price $6.60

Aerospace Corp., San Bernardino, Calif.
ATHENA DOCUMENTATION HANDBOOK,
by G. M. Tyner. 16 Dec 63, 64p. Rept. no. TOR169S3153 07 4
Contract AF04 695 269
Unclassified report

Descriptors: (*Hypersonic test vehicles, Documentation), (*Handbooks), (*Reports), Launch vehicles (Aerospace), Payload, Flight testing, Research program administration.

AD-434 199 Div. 12
OTS price $7.60

Aerospace Corp., Patrick AFB, Fla.
PROBABILITY MODEL FOR IMPACTING DEBRIS,
by J. L. Bagg. 6 Mar 64, 74p. Rept. no. ToR269A4306 5
Contract AF04 695 269
Unclassified report

Descriptors: (*Guided missile safety, Terminal ballistics), Programming (Computers), Aerodynamic characterics, Probability, Density, Malfunctions, Errors, Atmosphere entry, Hazards, Launching, Mathematical analysis, Atmosphere, Wind, Mathematical models, Distribution, Guided missile ranges.

A procedure for determining the expected number of pieces of lethal debris per square nautical mile is given in the study. An example is completely worked out and the computer programs used to obtain the results are included in Appendixes to this report. The method is different from the usual approach in that it accounts for varying crossrange dispersion due to the wide range of the aerodynamic characteristics of the debris. This is accomplished by obtaining a probability density function which has a variable angle theta to account for the crossrange dispersion. The method is applicable whenever a power failure occurs of thrust is terminated while the vehicle is otherwise performing within its nominal flight limits. It is not applicable in cases where a malfunction results in a powered tumbling turn. (Author)

AD-434 220 Div. 12
OTS price $8.10

Space Sciences Lab., General Electric Co., Philadelphia, Pa.
THEORETICAL HYPERVELOCITY IMPACT CALCULATIONS USING THE PICWICK CODE.
Interim rept., 24 June-23 Dec 63,
by T. D. Riney. Mar 64, 83p.
Contract AF08 635 3781, Proj. 5841
RTD ATL TDR64 8 Unclassified report

Descriptors: (*Hypervelocity projectiles, Terminal ballistics), Mathematical analysis, Mathematical models, Iron, Aluminum, Impact shock, Cratering, Propagation, Shock (Mechanics), Penetration, Velocity, Metal plates, Shock waves, Pressure, Lead, Viscosity, Plasticity.

The principle uncertainty in the visco-plastic model of hypervelocity impact is the lack of data on strain-rate effects under the severe conditions or interest. Estimates of strain-rate coefficient for iron and aluminum are first determined that are compatible both with observed strain-rate effects in plastic waves and the very abrupt shock profiles known to exist at pressures greater than about .2 megabar. In the second part of the report detailed calculations are presented describing the cratering process for a cylindrical projectile impacting a thick target of like metal. It is shown that momentum scaling cannot be justified; energy scaling for geometrically similar impact situations is accurately predicted upon taking into account the different rates of shock propagation during the early stages of the cratering process. Strength effects of the target do not vanish with increasing impact velocity. In the third part of the report the cratering and the penetration process for thin plates is studied. PICWICK calculations are presented and the results discussed in terms of the interactions of shock waves, rarefraction waves, and configuration geometry. (Author)

AD-434 270 Div. 12
OTS price $1.60

Space Sciences Lab., General Electric Co., Philadelphia, Pa.
AN APPROXIMATE METHOD FOR OPTICAL TRAJECTORY REDUCTION,
by Robert F. Hughes. 10 Dec 63, 17p. Rept. no. R63SD1045
Contract AF04 694 222

Unclassified report

Descriptors: (*Guided missile trajectories, Measurement), Analysis, Photographs, Night photography, Atmosphere entry, Reentry vehicles, Errors, Stars, Equations, Ballistic cameras, Optical analysis, Optical tracking.

A method is described for the determination of an approximate missile trajectory from optical observations. The advantage of an approximate trajectory is the use of single-station observations, the ease of measurements, and the simplicity of the calculations. Adequate results may be obtained quickly for many applications with minimum effort. The basic data consist of a night time trajectory photograph, trajectory timing, and the impact point. An inexpensive aerial camera would suffice for the optical data. Background stars define a coordinate system by which the angular trajectory relative to the observing station can be determined. The angular measurements plus an approximate trajectory plane orientation define the position coordinates. For short ranges, the impact and launch points fix a possible trajectory plane. (Author)

AD-434 323 Div. 12, 25
OTS price $3.60

Weather Group (4th), Andrews AFB, Washington, D. C.
INFRARED TECHNOLOGY AND AEROSPACE SYSTEMS.
1 Mar 64, 36p.
4 WG P 80 3 1 Unclassified report

Descriptors: (*Infrared research, Astrophysic), Attenuation, Infrared detectors, Defense systems, Meterological satellites, Guided missiles, Blackbody radiation, Infrared radiation, Stabilization, Aerospace craft, Radiometers, Photographic analysis, Clouds.

Every object in the universe, whose temperature is above absolute zero, emits infrared radiation. The fact that this radiation can be refracted, reflected, and diffracted like visible light has given rise to a technology known as infrared technology. The purpose of this discussion is to present some of the basic elements of this technology, especially those elements that are affected by the earth's atmosphere. The discussion follows this sequence: infrared physics, maximum emissions, IR detectors, atmospheric effects, missile defense systems, attitude control, and meteorological satellites. (Author)

AD-434 324 Div. 12, 2
OTS price $7.60

4th Weather Group, Eglin Air Force Base, Fla.
SOME EFFECTS OF THE NATURAL ENVIRONMENT ON AEROSPACE SYSTEMS.
23 Mar 64, 77p.
4 WGP P80 4 1 Unclassified report

Descriptors: (*Space environmental conditions, Guided missiles), (*Guided missile safety, Space environmental conditions), Wind, Atmospheric temperature, Lightning, Gust loads, Shear stresses, Density, Radiation damage, Atmosphere entry, Aerodynamic heating, Launching.

A typical aerospace mission from the pre-launch phase to recovery is described. At each stage of the operation, the effects of the natural environment are briefly examined from the standpoint of safety, reliability, and the overall performance of the systems. (Author)

AD-434 336 Div. 12
OTS price $1.60

Martin-Marietta Corp., Baltimore, Md.
TITAN. SCIENTIFIC PASSENGER POD ADDENDUM TO ANNEX FLIGHT TEST DIRECTIVE MISSILE N-33, XSM 68B WS-107A-2 PROGRAM.
1963, 15p.
Unclassified report

Descriptors: (*Flight testing, Telemeter data), (*Space capsules, Telemeter data), (*Telemeter data, Space capsules), Exhaust gases, Instrumentation, Guided missiles (Surface-to-surface), Air force.

This Addendum, together with the Basic Flight Test Directive, Lot N, MT-61-78449 and the Annex Flight Test Directive, Missile N-33 (U), MT-64-65765 specifies the AMR test program for the N-33 missile, USAF serial number 61-2756 and the scientific passenger pod (SPP) number T-207. Two telemetry packages will be ejected from the pod, after BECO, to ascertain the Titan II plume's radiation characteristics and to determine the effects of the plume on the ejected packages. The test period is from lift-off to loss of telemetry signal during flight. (Author)

AD-434 348 Div. 12, 2
OTS price $5.60

Mitre Corp., Bedford, Mass.
A BRIEF SURVEY OF SATELLITE ORBIT COMPUTATION METHODS AND MAJOR PERTURBATIVE EFFECTS,
by R. H. Greene. Mar 64, 55p. Rept. no. TM3641
Contract AF19 628 2390, Proj. 496L
ESD TDR63 477 Unclassified report

Descriptors: (*Celestial mechanics, Satellites (Artificial), (*Orbital trajectories, Celestial mechanics), Elliptical orbit trajectories, Perturbation theory, Radar tracking, Errors.

A brief descriptive survey of the various satellite orbit computation methods is presented in order to give the systems engineer an introduction to the various methods and problems which currently exist. (Author)

AD-434 396 Div. 12, 1
OTS price $1.60

Space-General Corp., Glendale, Calif.
PROJECT FIRST.
Monthly progress letter, 15 Jan-15 Feb 63,
by J. F. Keville. 18 Feb 63, 13p. Rept. no. 335 1
Contract AF33 657 10252
Unclassified report

Descriptors: (*Reentry vehicles, Parawings), (*Parawings, Reentry vehicles), Research program administration, Inflatable structures, Aerodynamic configuration, Structures, Stresses, Load distribution, Aerodynamic loading, Shear stresses, Analysis, Materials.

AD-434 968 Div. 12, 27, 10
OTS price $8.60

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
ROCKET MOTORS (Raketnaya tekhnika),
by E. B. Volkov. 12 Apr 63, 91p.
FTD MT63 44 Unclassified report

Trans. from Raketnaya Tekhnika, 1961.

Descriptors: (*Rocket motors (Solid propellant), Textbooks), (*Rocket motors (Liquid propellant, Textbooks), Thrust, Combustion, Combustion chambers, Rocket motor nozzles, Theory, Turbopumps, Hydrogen peroxide, Liquid rocket oxidizers, Solid rocket propellants, Rocket igniters, Rocket propellant grains, Specific impulse, Engineering, Design.

AD-434 971 Div. 12, 27, 10
OTS price $1.10

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
BEFORE THE SIGNAL LIFT OFF SOUNDS,
by Daniil Pipko. 24 Jan 64, 10p.
FTD MT63 224 Unclassified report

Trans. from Ogonek, No. 42, Cols. 1-4, p. 31, 14 Oct 63.

Descriptors: (*Space flight, Rocket propulsion), Spacecraft, Astronauts, Orbital trajectories, Turbojet engines, Fuel consumption, Ramjet engines, Satellites (Artificial), Plasma physics, Electric propulsion, Plasma engines, Descent trajectories, Deceleration.

AD-434 991 Div. 12, 19, 14
OTS price $1.60

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
SPACE SHIP RETURNS TO EARTH,
by K. Malyutin. 6 Dec 63, 11p.
FTD MT63 141 Unclassified report

Trans. from Kryl'ya Rodiny, No. 3, pp. 13-14, 1963.

Descriptors: (*Spacecraft, Atmosphere entry), Recovery, Nose cones, Reentry vehicles, Manned spacecraft, Descent trajectories, Orbital trajectories, Velocity, Deceleration, Aerodynamic heating, Thermal radiation, Landings, Space capsules, Retro rockets, Thrust, Heat-resistant materials, Earth, Cooling, Sea rescues, Public opinion.

AD-435 007 Div. 12
OTS price $1.60

Raymond Engineering, Inc., Middletown, Conn.
ARM SAFE DEVICE XM-52.
Final rept.,
by C. F. Nicoll, Jr. 24 Mar 64, 13p. Rept. no. 598 27; REL W 01689
Contract DA19 020 5010RD5273
Unclassified report

Descriptors: (*Arming devices, Accelerometers), Design, Timing devices, Environmental tests, Guided missile fuzes, Electric switches.

AD-435 036 Div. 12
OTS price $7.60

General Dynamics Astronautics, San Diego, Calif.
DYNAMICS OF THE ATLAS 5-CPS LONGITUINAL OSCILLATION FOLLOWING LAUNCH AS RELATED TO THE TANK PRESSURE REGULATION SYSTEM, VOLUME I: LONGITUDINAL MODEL DEVELOPMENT,
by R. G. Rose. 31 Dec 63, 80p. Rept. no. GDA63 0712, vol. 1.
Contract AF04 694 196; AF04 694 240
Unclassified report

Descriptors: (*Launch vehicles (Aerospace), Vibration), Oscillation, Propellant tanks, Launching, Models (Simulations), Elasticity, Pressure, Liquid rocket propellants, Pressure regulators, Pressure.

The basic objectives for Volume I are: (1) to provide a vibration analysis for a representative propellant tank solution in the form of a free-vibration solution (yielding the natural frequencies) and a forced vibration solution, and (2) to develop a single-mode tank model (and subsequently a vehicle model) which is more consistent with flight data and specifically suitable for studying the 5-cps oscillation problem at rise-off. The first objective provides useful information with respect to the individual tank vibration modes and their relative importance. It also provides a comparative basis for evaluating possible tank models. (Author)

AD-435 037 Div. 12, 30, 27
OTS price $7.60

General Dynamics Astronautics, San Diego, Calif.
DYNAMICS OF THE ATLAS 5-CPS LONGITUDINAL OSCILLATION FOLLOWING LAUNCH AS RELATED TO THE TANK PRESSURE REGULATION SYSTEM. VOLUME II, PNEUMATIC SYSTEM MODEL DEVELOPMENT,
by R. G. Rose. 31 Dec 63, 75p. Rept. no. GDA63 0712, vol. 2.
Contract AF04 694 196; AF04 694 240
Unclassified report

Descriptors: Launch vehicles (Aerospace), Oscillation), Guided missiles (Surface-to-surface), Vibration), Pneumatic systems, Pressure regulators, Pressure, Propellant tanks, Launching, Helium, Liquid rocket propellants, Temperature, Gas analysis, Duct inlets, Fuel systems, Liquefied gases, Oxygen, Heat exchangers, Equations, Mathematical analysis, Thermodynamics, Models (Simulation), Performance (Engineering).

Throughout the Atlas program there is evidence of a longitudinal oscillation of approximately five cycles per second immediately following launch. In many cases this oscillation is distinctly divergent for a short period of time. A few of these cases have reached an amplitude of some concern with respect to a possible failure of the intermediate bulkhead. A dynamic analysis of the 5-cps problem was instigated prior to the last Atlas/Mercury flight (130D), and has since been extended to space launch vehicles. The objectives of this 3-volume study were to explain the oscillation and investigate methods to eliminate or minimize the problem. This report discusses the five cycles per second oscillation in terms of coupling between the vehicle/fluid structure and the pneumatic tank pressure regulation system. (Author)

AD-435 084 Div. 12
OTS price $6.60

Boeing Co., Seattle, Wash.
ACCEPTANCE SUMMARY REPORT. FTM 436 MODEL SPECIFICATION S-133-1000-0-1,
by J. H. Kirby. 26 Jan 64, 20p. Document no. D2 3929 436
Contract AF04 694 422
Unclassified report

Descriptors: (*Guided missiles (Surface-to-surface), Specifications), Test vehicles, Military requirements, Tests, Data, Guidance, Control systems, Second-stage motors, Third-stage motors, Booster motors, Guided missile components, Quality control.

13. INSTALLATIONS AND CONSTRUCTION

AD-433 477 Div. 13, 15
OTS price $2.60

Mathematics Research Center, U. of Wisconsin, Madison.
BENDING OF AN ELLIPTIC PLATE UNDER A MOMENT AT

THE CENTER,
by Shun Cheng. Dec 63, 28p. Technical summary rept. no. 444
Contract DA11 0220RD2059
Unclassified report

Descriptors: (*Panels (Structural), Shear stresses), (*Elasticity, Mathematical analysis), Sandwich panels, Tensor analysis, Deflection, Special functions (Mathematical), Integrals, Stresses, Elastic shells, Sheets.

Solution for elliptical thin plates bent by a concentrated moment placed at the center of the plate is sought for built-in edges and for simply supported edges. In order that the conditions given on the elliptical boundary of the plate may be described as functions of only one coordinate, elliptic coordinates are used. With the aid of tensor calculus, the expressions for moments, shearing forces and the biharmonic equation for deflection are transformed into elliptic coordinates from their expressions in rectangular coordinates. The plates considered are assumed to be homogeneous and isotropic and of uniform thickness. (Author)

AD-433 522 Div. 13
OTS price $17.00

Massachusetts Inst. of Tech., Cambridge.
THE INTERACTION BETWEEN A STRUCTURAL TUBE AND THE SURROUNDING SOIL,
by Ulrich Luscher and Kaare Hoeg. Jan 64, 265p.
Contract AF29 601 4927, Proj. 1080, Task 108001
RTD TDR63 3109 Unclassified report

Descriptors: (*Underground structures, Cylindrical bodies), (*Cylindrical bodies, Structural shells), Loading (Mechanics), Buckling (Mechanics), Pipes, Aluminim, Plastics, Clay, Sand, Soil mechanics, Failure (Mechanics), Civil engineering, Theory, Experimental data.

This report describes experimental and theoretical research on the interaction between a structural tube and the surrounding soil. The experimental work used tubes of very small diameter, thus allowing a large number of tests to be run at low cost, but also preventing the use of any sophisticated instrumentation. The specific situations investigated were a flexible tube surrounded symmetrically by a thick cylinder of soil and loaded by uniform radial pressure, and a flexible tube buried under a horizontal soil surface and loaded by pressure applied on that surface. (Author)

AD-433 965 Div. 13
OTS price $10.50

IIT Research Inst., Chicago, Ill.
A STUDY OF THE DESIGN AND ANALYSIS OF FOUNDATIONS.
Final rept. Apr 62-June 63,
by S. Shenkman. Mar 64, 135p.
Contract AF29 601 5197, AF Proj. 1080; IITRI Proj. M255, Task 108003
RTD TDR63 3020 Unclassified report

Descriptors: (*Foundations, Stresses), (*Structures, Foundations), Dynamics, Mathematical models, Soil mechanics, Loading (Mechanics, Pressure, Damping, Shear stresses, Design, Analysis.

The behavior of foundations for protective structures is studies through a combination of theoretical and experimental research. Particular emphasis is placed on formulating a mathematical model which accurately predicts the gross motion of a dynamically loaded footing. A single-degree-of-freedom model incorporating a linear damping factor is developed and the results obtained from this model are correlated with the results from experiments performed under previous contracts. Other studies reported included three-dimensional static experiments of small model footings on cohesive soils; static experiments on a cohesionless soil where the footing and surrounding soil are subjected to overpressure; development of the logarithmic spiral failure surface for bearing capacity of continuous foundations; and a solution of a dissipation mechanism for dynamic soil behavior. (Author)

AD-434 074 Div. 13, 14
OTS price $16.50

Illinois U., Urbana.
BEHAVIOR OF SIMPLE AND RESTRAINED DEEP REINFORCED CONCRETE BEAMS UNDER STATIC LOADING,
by A. F. Dill and C. P. Siess. Mar 64, 259p.
Contract AF29 601 4578, Proj. 1080, Task 108003
RTD TDR63 3092 Unclassified report

Descriptors: (*Beams (Structural), Stresses), (*Reinforced concrete, Beams (Structural), Load distribution, Dynamics, Failure (Mechanics), Statics, Tests, Instrumentation, Strain gages, Shear stresses.

This investigation determined the influence of end restraint on the strength and behavior of reinforced concrete deep members subjected to slowly applied loads as a basis for the development of minimum design considerations. The end restraint was applied in such a manner as to simulate that which would be developed in continuous beams or frames. Static tests were made on fifteen beams of which five were simply supported and ten were restrained. The investigation is concentrated on the crushing stage as the last stage for which meaningful concrete strains were available. It is shown that deep beams do have a capacity beyond crushing in terms of deflections, and, sometimes, of moments. This reserve capacity is not now predictable in the same manner as the procedure developed herein to predict the capacity at crushing. (Author)

AD-434 077 Div. 13
OTS price $6.60

Army Cold Regions Research and Engineering Lab., Hanover, N. H.
A REVIEW OF MUSKEG AND ITS ASSOCIATED ENGINEERING PROBLEMS,
by John A. Pihlainen. Dec 63, 66p.
CRREL TR97 Unclassified report

Descriptors: (*Swamps, Engineering), (*Engineering geology, Swamps), Theory, Climatology, History, Biology, Geology, Construction, Road building equipment, Roads, Terrain.

Towards a reassessment of muskeg, an appraisal of the problems of muskeg showing the complexity of the subject and the implications for engineering is presented based on field experience and a study of the literature. A theory of the origin of muskeg is given from the engineer's point of view by considering climatic, biotic, and geologic factors. Muskeg research in other countries is reviewed with emphasis on Canadian research. The Radforth Muskeg Classification System, its ap-

plication to problems and modifications are discussed. Empirical data on the engineering properties of peat are broadly described in four main categories: (1) index properties, for identification; (2) strength and deformation properties; (3) thermal properties; and (4) geophysical properties. Engineering problems, construction equipment, and costs to be considered in vehicle trafficability, road construction, corrosion and drainage operations, and frozen muskeg and permafrost construction when muskeg is involved and fully discussed. Comprehensive conclusions and recommendations on the present state of knowledge of muskeg and needs for further research are outlined. (Author)

AD-434 084 Div. 13, 25
OTS price $1.60

Army Cold Regions Research and Engineering Lab., Hanover, N. H.
CIRCULAR PLATES ON ELASTIC, SEALED FOUNDATIONS,
by D. E. Nevel. Dec 63, 19p.
Proj. 8S66 02 001 01
Unclassified report

Descriptors: (*Flat plate models, Analysis), Ice, Airports, Control, Theory, Elasticity, Foundations (Structures), Moments, Supports, Loading (Mechanics), Volume, Water, Deflection, Shear stresses, Differential equations.

The observation that newly frozen ice sheets, resulting from pools of water freezing over, support more than would be predicted by ordinary theory is assessed. A solution is presented for a circular plate on an elastic, sealed foundation. Graphical results are shown for supports at the circumference of the plate. Graphs to obtain moments in a circular plate on an elastic bearing surface, using a sealed or unsealed foundation, are compiled for fixed and simple supports. In reality the foundation may not be completely sealed, calling for discretion in selecting the actual moment. The ability of the refrozen ice sheet to support the extra load is explained by the fact that the water has been sealed between the surface and main sheet of ice and the volume occupied by the water cannot change. (Author)

AD-434 118 Div. 13
OTS price $2.60

Naval Civil Engineering Lab., Port Hueneme, Calif.
SNOW COMPACTION IN ANTARCTICA-ROADS ON SNOW-COVERED SEA ICE.
Final rept.,
by Earl H. Moser, Jr. 16 Mar 64, 21p.
Proj. Y F015 11 01 053
NCEL R298 Unclassified report

Descriptors: (*Roads, Snow), (*Snow, Polar regions), (*Polar regions, Roads), Temperature, Physical properties, Construction, Ice, Storms.

During the austral summer of Deep Freeze 61 the Laboratory provided technical guidance to a Navy snow-compaction team testing the practicability of compacted roads on snow-covered sea ice over McMurdo Sound. An experimental 22-foot-wide road was constructed between McMurdo Station and Williams field in October and November 1960. This road included 3 miles of snow road, 1.4 miles of ice road, a snow-wedge transition ramp between the ice road and the snow road, and a snow, ice, and gravel transition ramp between the ice road and the shore at McMurdo Station. During construction snow road was depressed about 10 inches below the natural surface of the snow. This accelerated the accumulation of drift, which was windrowed to the edges of the road following each storm. Eventually berms 2 feet high were built up along each side of the road. As a result, in mid-December a 3-day blizzard filled the roadway with snow and it was abandoned. The road was used day and night for a 10-day period during late November and early December by all types of wheeled vehicles including 30-ton tractor-and-trailer rigs. It was concluded that a network of snow roads between McMurdo Station and its outlying facilities will improve the ground communications and transportation threefold between these points. However, continued development is required to improve the construction and maintenance techniques for such roads. (Author)

AD-434 217 Div. 13
OTS price $10.10

Naval Civil Engineering Lab., Port Hueneme, Calif.
A TEMPORARY POLAR CAMP.
Final rept.,
by G. E. Sherwood. 26 Mar 64, 126p.
Proj. Y F015 11 104
NCEL R288 Unclassified report

Descriptors: (*Buildings, Construction), Air conditioning equipment, Design, Sanitary engineering, Shelters, Medicine, Water supplies, Storage, Recreation, Distribution, Wastes (Sanitary engineering), Heating.

A temporary polar camp was developed to provide comfortable living conditions for periods up to 5 years in the Arctic and Antarctic. The camp design includes structures, air conditioning, water supply, sanitation, and other facilities integrated to form a unified functional component. The basic camp was designed for 50-man occupancy and expansion in 50-man increments to a 200-man capacity. Each man is provided with an individual room. Double bunks may be used, with two men sharing a room to increase the camp capacity for short periods. The building unit is the Modified T-5, variously outfitted for use as quarters, messing, galley, utilities, administration, communications, recreation, medical, head, laundry, and storage facilities. A duplex concept is used by which two building units are joined end to end by a service core which houses an air-conditioning system, head, and laundry, to form a basic building. A T-5M maintenance shelter is provided for maintenance of camp equipment. The component parts of the packaged camp are lightweight and compact for transport by C-130 or other aircraft. All components are prefabricated for fast, easy erection even under the extreme weather conditions prevalent in polar regions. (Author)

AD-434 222 Div. 13
OTS price $7.60

Naval Civil Engineering Lab., Port Hueneme, Calif.
MODEL STUDIES OF LARGE VENTED OPENINGS-PHASE 1,
by Donald S. Teague, Jr. 5 Mar 64, 71p.
Proj. Y F008 08 02 106
NCEL TR R274 DASA 13 154 Unclassified report

Descriptors: (*Shelters, Structural parts), (*Blast, Shielding), (*Ventilation ducts, Protective coverings), Generators, Design, Models (Simulations), Shock tubes.

To determine the optimum configuration of pits for protecting generators from blast loading, tests were conducted using the NCEL Twelve-Inch Shock Tube. The effects of overpressure and dynamic pressure were considered separately. Overpressure was measured quantitatively by a pressure cell mounted in the bottom of the model pit; dynamic pressure was measured qualitatively by observing the bending of 3-or-4-in. lengths of 1/16-in. solder. For the overpressure tests, the model pit was mounted inside the shock tube. For the dynamic pressure tests, the model pit was mounted outside, at the outlet of the shock tube. Various parapets and covers (including gratings and special structures) were installed around or over the pit. No parapets or covers were found that appreciably reduce the overpressure in the pit, but all reduce the dynamic pressure to some extent. The parapets make the least reduction, and the gratings the most. Special structures, such as louvres, reduce dynamic pressure by various amounts according to their design, but simplicity and effectiveness make the use of gratings appear more promising. (Author)

AD-434 271 Div. 13
OTS price $5.60

Fritz Engineering Lab., Lehigh Univ., Bethlehem, Pa.
PLASTIC DESIGN IN HIGH STRENGTH STEEL.
by Theodore V. Galambos and Maxwell G. Lay.
Mar 64, 53p. Rept. no. 297 5
Contracts NObs90041, NBy5310
Unclassified report

Descriptors: (*Steel, Ductility), (*Earthquake-resistant structures, Design), Plasticity, Structures, Beams (Structural), Deformation, Loading (Mechanics), Energy, Absorption, Shock (Mechanics), Elasticity, Earthquakes, Deflection, Mathematical analysis, Buckling (mechanics), Theory, Experimental data, Buildings.

Part of the energy of a severe earthquake shock is absorbed by the inelastic deformation of the structural frame. In order to assess the inelastic deformability of a steel frame, it is necessary to know the load-deformation behavior of its components. The inelastic load-deformation response of beams, beam-columns and beam-and-column subassemblages which are subjected to static unidirectional loading is examined. The response criterion for a member is the end moment-end rotation relationship. It is shown, both from experimental and theoretical considerations, that the inelastic load-deformation behavior of wide-flange steel frames and frame components can be predicted and that therefore the energy absorption capacity of these frames can be assessed. (Author)

AD-434 754 Div. 13
OTS price $4.60

Fritz Engineering Lab., Lehigh U., Bethlehem, Pa.
FURTHER STUDIES OF THE MOMENT-THRUST-CURVATURE RELATIONSHIP,
by M. G. Lay and N. Gimsing. Jan 64, 46p.
Rept. no. 297 4
Contracts Nobs90041, NBy53160
Unclassified report

Report on Plastic Design in High Strength Steel.

Descriptors: (*Structural parts, Steel), (*Structural properties, Mathematical analysis), Deformation, Moments, Buckling, Design, Structures, Strain (Mechanics), Stresses, Elasticity, Plasticity, Strain gages, Beams (Structural), Compressive properties, Tensile properties.

The relationship between bending moment, axial force and curvature is basic to the study of structures. The problem has been solved theoretically in a number of ways, but the experimental aspect has received less attention. This report gives some experimental confirmation of the predicted behavior. It is found that, on an overall scale, the existing theories provide an adequate representation of the behavior, although allowance must be made for the occurrence of local buckling. On a localized scale the agreement between test and theory is not consistently reliable, and it becomes apparent that the overall theory is an average representation of the number of dissimilar conditions. However, this average representation appears adequate for most structural purposes. (Author)

AD-434 846 Div. 13
OTS price $12.50

Technische Hochschule, Hannover, (Germany).
INVESTIGATION OF PLATE AND SHELL MODELS BY MATRICES,
by Eduard Pestel. May 63, 174p.
Grant AF EOAR61 46
AFOSR 64 0592 Unclassified report

Descriptors: (*Structural shells, Matrix algebra), (*Disks, Matrix algebra), Cylindrical bodies, Elasticity, Stresses, Deformation, Vibration, Shear stresses, Stability, Motion.

Grid models for arbitary triangular and trapezoidal shapes are developed, and the effect of shear deformation in bending problems is included. A straightforward method for the application of Hrennikoff's models to shell problems was derived. Due to the scope of the problem the work is limited to cylindrical shells,, but there should be no essential difficulty in extrapolating the method with the aid of the catalogue of Hrennikoff-models given at the end of Chapter 2 to other types of shells. Also a concise method for the derivation of the stiffness-matrix for Hrennikoff's model is developed. Finally certain basic problems concerning the lumped parameter technique which is ordinarily employed in conjuction with grid models for vibration problems, and the case of random-vibrations which we deal with via the frequency response of the structure which is obtained by transfer matrix methods. Together with a brief statement concerning the use of transfer matrices for problems in dynamic stability these additional topics are discussed. (Author)

AD-434 891 Div. 13
OTS price $3.60

Naval Civil Engineering Lab., Port Hueneme, Calif.
INITIAL FIELD TESTING OF AIRFIELD MARKING PAINTS,
by R. W. Drisko and A. E. Hanna. 26 Mar 64, 34p.
Proj. Y R007 08 03 303
NCEL R296 Unclassified report

Descriptors: (*Runways, Paints), (*Paints, Runways), Tests, Airports, Asphalt, Life expectancy.

Division 13 - INSTALLATIONS AND CONSTRUCTION

This is the first of a series of reports on studies of airfield marking paints. Stripes of different paints with differently reflectorized surfaces were applied to an asphaltic runway. This report describes their application and condition at the times of three different inspections made within two months after application. (Author)

AD-434 917 Div. 13
OTS price $3.60

Naval Civil Engineering Lab., Port Hueneme, Calif.
YOUNG'S MODULUS OF ELASTICITY AND POISSON'S RATIO OF PLAIN CONCRETE.
Final rept.
by W. L. Cowell. 3 Apr 64, 38p.
Proj. Y R011 01 003
NCEL TR R285 Unclassified report

Descriptors: (*Concrete, Elasticity), Stresses, Loading (Mechanics), Cylindrical bodies.

Dynamic and static determinations of Young's modulus and Poisson's ratio were made on concrete cylinders to establish a relationship between the two methods when applied to concrete test specimens. Three curing conditions, three sizes of cyliners, and two strengths of concrete were used; the cylinders were tested at 2, 4, 7, 12, and 24 weeks from the casting date. Dynamic values were calculated from the fundamental transverse, longitudinal, and torsional frequencies of the specimens. The static test results were not influenced by the cylinder size, and no difference could be found between the dynamic results for the cylinders. Dynamic values are affected slightly by prior static loading, the concrete cylinders exhibiting a small reduction in Young's modulus. The magnitude and recovery of this loss is dependent upon the age and/or the moisture content of the concrete at time of test. There is no constant relationship between the values for Young's modulus of elasticity and Poisson's ratio for concrete as determined by static and dynamic methods. (Author)

AD-434 996 Div. 13, 30
OTS price $1.60

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
ULTRASOUND,
by Yu. Urzhumtsev. 19 Dec 63, 9p.
FTD MT63 129 Unclassified report
Trans. from Nauka i Tekhnika, Naukaizhittya, No. 7, pp. 8-10, 1962.

Descriptors: (*Concrete, Ultrasonic radiation), (*Reinforced concrete, Ultrasonic radiation), (*Ultrasonic radiation, Test methods), Mechanical properties, Elasticity, Propagation, Velocity, Sound transmission, Tests.

AD-435 076 Div. 13, 25
OTS price $2.60

Brown U., Providence, R. I.
ON THE POSTULATE OF STABILITY OF MATERIAL IN THE MECHANICS OF CONTINUA,
by D. C. Drucker. Nov 63, 25p. Rept. no. TR34
Contract Nonr56220, Proj. NR064 424
Unclassified report

Descriptors: (*Continuum mechanics, Materials), (*Stability, Theory), Elasticity, Plasticity, Viscosity, Stresses, Strain (Mechanics), Functions, Statics, Force (Mechanics), Loading (Mechanics), Viscoelasticity.

Stability in the small seems to be a reasonable postulate for both time-independent and time-dependent material deformed isothermally. Stability in the large seems appropriate for isothermal time-independent material in which recoverable strains are small. Although full stability is far too restrictive for time-dependent material, a limited stability in the large appears to be an assumption well worth additional exploration. (Author)

AD-435 077 Div. 13, 25
OTS price $2.60

Brown U., Providence, R. I.
A RAPID METHOD FOR ESTIMATING THE GREATEST STRESS IN A STRUCTURE SUBJECT TO CREEP,
by C. R. Calladine. Nov 63, 28p. Rept. no. TR35
Contract Nonr56220, Proj. NR064 424
Unclassified report

Descriptors: (*Structures, Creep), (*Stresses, Mathematical analysis), Design, Functions, Temperature, Elasticity, Plasticity, Thermal stresses, Loading (Mechanics), Theory, Beams, Disks, Sheets, Cylindrical bodies.

Several simple structures made of material in which the creep strain rate is proportional to the nth power of stress are studied with a view to determining the way in which the greatest stress in a structure varies with the exponent n when the geometry of the structure and the load carried by the structure remain unchanged. (Author)

14. MATERIALS (NON-METALLIC)

AD-433 484 Div. 14
OTS price $10.10

National Research Corp., Cambridge, Mass.
THEORETICAL AND EXPERIMENTAL STUDY TO DETERMINE OUTGASSING CHARACTERISTCS OF VARIOUS MATERIALS,
by M. P. Schrank, F. C. Benner and D. K. Das.
Mar 64, 122p.
Contract AF40 600 999, Proj. 7778, Task 777801
AEDC TDR64 53 Unclassified report

Descriptors: (*Materials, Degasification), (*Space environmental conditions, Test facilities), Aluminum alloys, Stainless steel, Ceramic materials, Elastomers, Paints, Halocarbon plastics, Butyl rubber, Mass spectroscopy, Cryogenics, Vacuum apparatus.

The report presents the results of experimental studies in outgassing characteristics of materials including both total outgassing rates and analysis of constituents. Two types of experiments were performed: (1) outgassing of structural materials using metal bell jars made of the test material, and (2) outgassing of small test samples installed in a glass vacuum system. (Author)

AD-433 488 Div. 14
OTS price $.75

National Carbon Co., Lawrenceburg, Tenn.
RESEARCH AND DEVELOPMENT ON ADVANCED GRAPHITE MATERIALS. VOLUME XXIII. A METHOD FOR DETERMINING YOUNG'S MODULUS OF GRAPHITE AT ELEVATED TEMPERATURES.
Rept. for 1 Nov 61-1 May 62,
by S. O. Johnson and R. B. Dull. Feb 64, 22p.
Contract AF33 616 6915 Proj. 7350, Task 735002
WADD TR61 72 Vol. XXIII
Unclassified report

Report on Refractory Inorganic Non-Metallic Materials.

Descriptors: (*Graphite, Elasticity), Stresses, Deformation, Refractory materials, Laboratory furnaces, Anisotropy, Vibration.

AD-433 501 Div. 14
OTS price $1.60

General Technologies Corp., Alexandria, Va.
A STUDY OF HIGH MODULUS, HIGH STRENGTH FILAMENT MATERIALS BY DEPOSITION TECHNIQUES.
Bi-monthly progress rept. no. 2, 1 Jan-29 Feb 64,
by L. G. Davies and J. C. Withers. 15 Mar 64, 14p.
Contract NOw64 0176c
Unclassified report

Descriptors: (*Ceramic fibers, Vapor plating), (*Filaments, Boron), Material forming, Carbides, Silicon compounds, Titanium compounds, Tensile properties, Composite materials, Boron compounds, Borides, Reduction (Chemistry), Hydrogen, Microstructure, Halides.

Silicon carbide and titanium carbide filaments were deposited by vapor deposition techniques. An abbreviated study of the effect of varying deposition parameters upon tensile strength was made using boron filaments produced from diborane. The tensile strength was found to vary widely by adjusting the deposition parameters of temperature and gas ratios. The tensile strength of all materials deposited to date was measured. (Author)

AD-433 555 Div. 14
OTS price $1.10

Aeronautical Materials Lab., Naval Air Engineering Center, Philadelphia, Pa.
EVALUATION OF NATIONAL RESEARCH CORPORATION GLASS MONOFILAMENTS.
6 Feb 64, 3p.
NAEC AML 1884 Unclassified report

Descriptors: (*Glass, Filaments), (*Metal coatings, Zinc), Vapor plating, Fracture (Mechanics), Tensile properties, Aging (Materials).

AD-433 651 Div. 14
OTS price $1.25

Army Engineer Waterways Experiment Station, Vicksburg, Miss.
HIGH-COMPRESSIVE-STRENGTH CONCRETE. DEVELOPMENT OF CONCRETE MIXTURES,
by Eugene F. Smith, William O. Tynes and Kenneth L. Saucier. Feb 64, 47p.
Proj. 1080, Task 10803
RTD TDR63 3114 Unclassified report

Descriptors: (*Concrete, Manufacturing methods), (*Performance (Engineering), Concrete), Aging (Materials), Compressive properties, Tensile properties, Elasticity.

Approximately 150 mixtures were made in this investigation. The effects of the size of test specimen, the size and type of coarse aggregate, the grading of the fine aggregate, the type of cement, and the type and quantity of water-reducing admixture were studied. The results indicate that a water-cement ratio of approximately 0.30, by weight, which generally requires the use of 10 bags of portland cement per cubic yard of concrete, a limestone, quartzite, or traprock coarse aggregate, and continuous moist curing for at least 28 days are required to produce workable concrete with a compressive strength in excess of 10,000 psi at 90 days.

AD-433 652 Div. 14
OTS price $2.75

Douglas Aircraft Co., Inc., Santa Monica, Calif.
OPTIMUM CONSTRUCTION OF REINFORCED PLASTIC CYLINDERS SUBJECTED TO HIGH EXTERNAL PRESSURE.
Final rept. 6 Mar 63-6 Mar 64,
by H. R. Jacobson. 6 Mar 64, 129p. Rept. no. SM45871
Contract NObs88425, Proj. SF013 05 03, Task 1025
Unclassified report

Descriptors: (*Cylindrical bodies, Filament wound construction), (*Filament wound construction, Optimization), Laminated plastics, Reinforcing materials, Glass textiles, Laminates, Buckling (Mechanics), Hydrostatic pressure, Loading (Mechanics), Compressive properties, Elasticity, Strain (Mechanics), Stresses, Theory, Differential equations, Mathematical analysis, Structures, Deformation, Mandrels, Manufacturing methods, Construction, Submarine hulls, Weight, Buoyancy, High pressure research.

The purpose of this program was to develop and substantiate a theoretical method for accurately predicting the critical buckling strength of externally pressurized cylinders fabricated from filament reinforced plastic laminates and to determine the optimum construction for such cylinders. Cylinders representing various configurations of four different types of construc-

tion were fabricated and tested. The critical buckling pressure under hydrostatic loading and the elastic constants influential in buckling considerations were determined from the test cylinders and rings cut from them and compared with theoretically calculated values for each configuration. (Author)

AD-433 653 Div. 14
OTS price $8.10

Electronic Defense Lab., Mountain View, Calif.
FERROELECTRIC BIBLIOGRAPHY SUPPLEMENT,
by Robert D. Hall. 23 Aug 63, 90p. Technical memo no. M557
Contract DA36 039AMC00088E
Unclassified report

Descriptors: (*Bibliographies, Ferroelectric materials), (*Ferroelectric materials, Bibliographies), Oxides, Phosphates, Sulfates, Titanates, Selenides, Single crystals, Ceramic materials, Crystal growth, Theory, Dielectric properties, Electrical properties, Piezoelectric effect, Optical properties, Physical properties.

AD-433 661 Div. 14
OTS price $.50

Coating and Chemical Lab., Aberdeen Proving Ground, Md.
NEW CORROSION INHIBITORS FOR ANTIFREEZES,
by Charles B. Jordan. 16 Jan 64, 14p.
DA Proj. 1A0 24401A109
CCL 155 Unclassified report

Descriptors: (*Freezing point depressants, Additives), (*Corrosion inhibition, Coolants), (*Coolants, Corrosion inhibition), Glycols, Thiazoles, Thiols, Sodium compounds, Borates, Phosphates, Alkynes.

The object of this study was to conduct a preliminary investigation of newly developed corrosion inhibitors and inhibitor combinations for use in automotive coolants. Bench corrosion tests were conducted on the following inhibitors in water and ethylene glycol/water solutions: sodium tetraborate/propylene glycol condensate, the double condensate of sodium tetraborate with propylene glycol and butynediol, and Specification O-1-490 inhibitor modified by adding disodium phosphate and increasing the mercaptobenzothiazole content. Many combinations of these inhibitors performed satisfactorily in the bench corrosion tests. Dynamometer tests and field tests are warranted. (Author)

AD-433 744 Div. 14
OTS price $1.60

Aeronautical Materials Lab., Naval Air Engineering Center, Philadelphia, Pa.
DEVELOPMENT OF COATINGS TO PREVENT OVERHEATING OF UNDERLYING SUBSTRATES ON EXPOSURE TO INTENSE THERMAL RADIATION FOR SHORT PERIODS: NAEC AML 1872, DEVELOPMENT OF BLACK THERMAL REFLECTIVE, SOLVENT REMOVABLE, EXTERIOR CAMOUFLAGE FINISH.
17 Jan 64, 11p.
NAEC AML1872 Unclassified report

Descriptors: (*Coatings, Camouflage), (*Camouflage, Aircraft finishes), Performance (Engineering), Environmental tests, Epoxy plastics, Nitrocellulose, Acrylic resins, Aging (Materials), Antimony compounds, Sulfides, Heat, Absorption.

AD-433 806 Div. 14
OTS price $2.60

Space Sciences Lab., General Electric Co., Philadelphia, Pa.
EFFECT OF GLASS FORM ON STRENGTH,
by B. Walter Rosen. Feb 64, 28p. Rept. no. R64SD18
Unclassified report

Descriptors: (*Glass textiles, Mechanical properties), (*Fibers (synthetic), Mechanical properties), Compressive properties, Tensile properties, Stresses, Epoxy plastics, Density, Configuration, Stiffened cylinders, Cylindrical bodies, Solids, Buckling.

The effect of glass fiber from on the strength of reinforced plastic composites was studied analytically. Results indicate that hollow glass fiber composites produce lower weight structures than equivalent solid glass fiber composites for applications where compressive strength or stability is the governing design criterion. Compressive and tensile applications were considered and the results of an approximate solution for the internal stresses in the vicinity of a discontinuous fiber are presented. (Author)

AD-433 811 Div. 14
OTS price $7.60

Purdue U., Lafayette, Ind.
MATERIALS SCIENCES RESEARCH.
Annual rept. no. 2, for 1963.
Mar 64, 77p.
Contract SD102
Unclassified report

Descriptors: (*Scientific research, Materials), (*Reports, Scientific research), Rare earth compounds, Cyanates, Fluorine compounds, Xenon, Transition elements, Metals, Carbonyl group, Spectra (Infrared), Raman spectroscopy, Mass spectroscopy, Molecular structure, Statistical mechanics, Thermodynamics, Diatomic molecules, Free radicals, Boranes, Semiconductors, Magnesium alloys, Crystal structure, Radiation damage, Germanium, Silicon, Metallurgy, Chromium, Iron, Lasers, Ruby, Sapphires, Abstracts.

AD-433 829 Div. 14
OTS price $.75

Coating and Chemical Lab., Aberdeen Proving Ground, Md.
THE DEVELOPMENT OF AN IMPROVED COOLING SYSTEM CORROSION INHIBITOR,
by James H. Conley. 10 Feb 64, 23p.
DA Proj. 1A0 24401A109
CCL 156 Unclassified report

Descriptors: (*Freezing point depressants, Additives), (*Corrosion inhibition, Coolants), (*Coolants, Corrosion inhibition), Glycols, Sodium compounds, Borates, Phosphates, Thiazoles, Thiols.

The object of this study was to develop an improved inhibitor combination for use in water bnd ethylene glycol type antifreeze mixtures. Bench corrosion tests were used for initial screening. The more promising coolant and inhibitor combinations were then evaluated in simulated service tests. One combination was chosen for vehicle field tests. An improved inhibitor was found which consists of boraz, mercaptobenzothiazole and disodium phosphate. It is recommended that the results of this study be used as a basis for the revision of Federal Specification O-1-490. (Author)

AD-433 950 Div. 14
OTS price $4.60

Eastman Kodak Co., Rochester, N.Y.
LONG WAVELENGTH INFRARED DOMES.
Final technical rept., July 62-Oct 63.
Mar 64, 50p.
Contract AF33 657 8712, Proj. 4056, Task 405603
AL TDR64 9 Unclassified report

Descriptors: (*Infrared domes, Materials), (*Infrared optical materials, Material forming), (*Selenides, Zinc compounds), Hydraulic presses, Induction heating, Bonding, Coatings, Fluorides, Reflection, Absorption, Mechanical properties, Elasticity, Refractive index, Lenses, Infrared windows, Heat treatment, Barium compounds.

Zinc selenide was developed into a useful infrared optical material for the 1 to 20 micron range. Hot-pressing was used to fabricate 6 in. diameter flats and 4 in. diameter domes. Procedures are described for annealing the material which is highly strained when it is hot-pressed. A method is described for bonding hot-pressed sections into larger mosaics by direct fusion or welding. A barium fluoride low reflection coating was the best of several systems investigated. Optical working and polishing methods are presented. Physical and chemical property measurements are reported. (Author)

AD-434 173 Div. 14
OTS price $12.00

Hughes Aircraft Co., Culver City, Calif.
ALUMINUM OXIDE. DATA SHEETS,
by John T. Milek. Mar 64, 169p. Rept. no. DS136
Contract AF33 615 1235, Proj. 7381, Task 738103
Unclassified report

Descriptors: (*Aluminum compounds, Oxides), (*Oxides, Ceramic materials), (*Ceramic materials, Aluminum compounds), Sapphires, Reviews, Electrical properties, Dielectric properties, Resistance (Electrical), Electrical conductance, Single crystals, Crystals, Data, Bibliographies, Sintering, Powders.

A compilation of the electrical properties of a wide range (80-100%) Aluminum oxide ceramic composition is presented herein. Included are Sapphire, Sintered single crystal and Polycrystalline material. Detailed electrical properties for the individual Alumina material data sheet include dielectric constant, dielectric strength, dissipation factor, electrical conductivity, electrical resistivity, loss factor and Te value. Each property is compiled over the widest possible range of temperatures and frequencies from references obtained in a thorough literature search. The crystal structure, applications and phase diagrams are briefly reviewed. (Author)

AD-434 204 Div. 14
OTS price $.75

Rock Island Arsenal Lab., Ill.
SURFACE CHEMISTRY OF SOME LUBRICANT ADDITIVES,
by S. Fred Calhoun and Max T. Fisher. 24 Jan 64, 17p.
DA Proj. 1A0 10501B010
RIAL 64 232 Unclassified report

Descriptors: (*Lubricant additives, Surface properties), (*Lubrication, Lubricant additives), (*Adsorption, Lubricant additives), Lubricants, Tracer studies, Humidity, Storage, High-temperature research, Ball bearings, Surface tension, Tritiated compounds, Organic solvents, Monomolecalar films, Sulfonates, Lead compounds, Barium compounds, Antimony compounds, Organic sulfur compounds, Amines, Carboxylic acids, Ethers, Aromatic compounds, Sulfur compounds, Fish oils.

Eleven compounds or combinations of compounds were studied in this investigation. They were added to white mineral oil and evaluated for their effect upon the lubricative properties of the oil. Results were a positive but varied improvement for all additives. Six were tritiated and their absorption on bearing steel specimens studies by radioactive counting. An increase in temperature and humidity resulted in variable increases in absorption. It was observed that on static storage some additives apparently settled in the lubricant without forming a precipitate. Others formed a visible precipitate. In either case, their effect upon the lubrican was appreciably diminished. Degreasing with trichloroethylene seemed to eliminate the lubricative ability of the additive but radioactive counting disclosed some still to be present on the degreased test specimen. (Author)

AD-434 213 Div. 14
OTS price $.50

Naval Research Lab., Washington, D. C.
HYDROPHOBIC AND OLEOPHOBIC FLUOROPOLYMER COATINGS OF EXTREMELY LOW SURFACE ENERGY.
Interim rept.,
by Marianne K. Bernett and W. A. Zisman.
14 Feb 64, 10p.
Proj. RR001 01 43 4751
NRL 6039 Unclassified report

Descriptors: (*Plastic coatings, Surface properties), (*Halocarbon plastics, Surface properties), (*Surface active substances, Coatings), Esters, Fluorine compounds, Humidity, Lubricants, Protective treatments, Plastics, Metals, Glass, Sapphires, Stability, Compatibility.

A comparison of the critical surface tension of wetting of new but commercially available polymeric solids revealed that a group of polyfluoroesters had the lowest values of any plastics or other solids yet reported. In order to assess their possible utility in certain new potential naval applications, experimental studies were made on the effect of high humidity and immersion in organic liquids on thin coatings of the two fluorinated polyesters. No changes in coating adhesion to the underlying resin or metal surface were found after such exposures. Prevention of spreading by fine instrument oils on surfaces of substances such as stainless steel, sapphire, and Pyrex glass was also investigated. The results showed these polymer coatings will have future usefulness in several new types of applications among which are prevention of liquid penetration in electrical, electronic, and mechanical equipment; parting agents or abhesives for mold release applications; barriers to prevent oil spreading in fine instruments; and reduction of surface electrical leakage. (Author)

AD-434 280 Div. 14
OTS price $1.60

Aerojet-General Corp., Sacramento, Calif.
DEVELOPMENT OF HIGH-STRENGTH IMPREGNATED ROVING FOR FILAMENT WINDING.
Bimonthly rept. no. 5, 11 Dec 63-10 Feb 64,

by I. Petker, M. Segimoto, K. W. Smith and R. A. Galuzerski. 20 Mar 64, 18p. Rept. no. 0627V5
Contract NOw63 0627c
Unclassified report

Descriptors: (*Filament wound construction, Rocket cases), (*Glass textiles, Impregnation), Tensile properties, Textiles, Coatings.

AD-434 350 Div. 14
OTS price $.75

Rock Island Arsenal Lab., Ill.
IMPROVEMENT OF HIGH TEMPERATURE PROPERTIES OF A FLUOROELASTOMER,
by E. W. Bergstrom. 14 Oct 63, 18p.
Proj. 1H0 24401A110 03
RIAL 63 3347 Unclassified report

Descriptors: (*Vulcanizates, Aging (Materials)), (*Heat-resistant plastics, Aging (Materials)), (*Halocarbon plastics, Aging (Materials)), Aging (Materials), Additives, Elastomers, Thermosetting plastics, Mechanical properties, Tensile properties, Gamma rays, Amines, Aromatic compounds, Halogenated hydrocarbons, Fluorine compounds, Polymers.

Sixty-eight chemicals were evaluated as curatives for vinylidene fluoride/hexafluoropropylene (FPM) in an attempt to improve the retention of properties when measured at high temperatures. Several chemicals were found to be effective curatives for thin (.075 - .085) specimens. However, when thicker (0.5in) pieces were post cured they became porous and puffy. Efforts to eliminate this porosity were unsuccessful. Certain elastomers and thermosetting resins, when used as additives in N,N'-dicinnamylidene-1, 6-hexanediamine cured FPM significantly improved the tensile strength of the vulcanizates when measured at high temperature. An increase in tensile strength of more than 96% at 400 F was found in one instance. Porosity was not a problem with these vulcanizates. Attempts were also made to improve the properties at high temperature by using irradiation (gamma) curing. No significant improvement was found. Author)

AD-434 600 Div. 14
OTS price $3.60

Radiation Effects Information Center, Columbus, Ohio.
MONTHLY ACCESSION LIST. ABSTRACT NO. 22919 TO 23001. PART I.
10 Apr 64, 35p. Acession list no. 73
Contract AF33 615 1124
Unclassified report

Descriptors: (*Abstracts, Radiation damage), (*Radiation damage, Abstracts), Documentation.

AD-434 601 Div. 14, 20
OTS price $1.66

Radiation Effects Information Center, Columbus, Ohio.
MONTHLY ACCESSION LIST COORDINATE INDEX PART II.
10 Apr 64, 13p.
Unclassified report

Descriptors: (*Indexes, Radiation effects), Gamma rays, Materials, Radiation damage, Chemical compounds, Neutrons, Nuclear particles, Thermal radiation, Temperature, Spacecraft, Space environmental conditions, Electronic equipment, Steel, Metals, Ceramic materials, Electronics, Dosimeters.

AD-434 815 Div. 14
OTS price $5.60

Forest Products Lab., Madison, Wis.
PROCEEDINGS OF THE SYMPOSIUM ON NONDESTRUCTIVE TESTING OF WOOD.
Mar 64, 58p.
FPL 040 Unclassified report

In cooperation with the National Lumber Manufacturer Association, Madison, Wis.

Descriptors: (*Symposia, Wood), (*Non-destructive testing, Symposia), (*Wood, Non-destructive testing), Electrical properties, Physical properties, Structural properties, Moisture, Density, Degradation, Stresses, Radiography, Capacitance, Resistance (Electrical), Nuclear magnetic resonance, Piezoelectric effect, Vibration, Microwaves, Ultrasonic radiation.

AD-434 893 Div. 14
OTS price $3.60

Feltman Research Labs., Picatinny Arsenal, Dover, N. J.
DILUTE SOLUTION PROPERTIES OF HIGH-MOLECULAR WEIGHT POLY(ISOBUTYL METHACRYLATE). I. VISCOSITY IN METHYL ETHYL KETONE,
by Richard J. Valles, Eleanor C. Schramm, James Stout and David W. Levi. Feb 64, 35p.
Proj. 1A01050 1B010
FRL TR3113 Unclassified report

Descriptors: (*Polymers, Viscosity), (*Viscosity, Solutions), Acrylic resins, Organic solvents, Ketones, Esters, Shear stresses.

The viscosities of methyl ethyl ketone solutions of high-molecular-weight poly (isobutyl methacrylate) were found to be shear dependent. Corrections for this shear dependence were applied by using a five-bulb capillary viscometer. The data were treated by a conventional double plot method, a triple plot method, and by including a higher concentration term. Intrinsic viscosities obtained from the different treatments agreed well. (Author)

AD-434 896 Div. 14
OTS price $5.60

Army Engineer Waterways Experiment Station, Vicksburg, Miss.
LABORATORY AND FIELD STUDY OF EPOXY-ASPHALT CONCRETE,
Jan 64, 35p.
AEWES TR3 638 Unclassified report

Descriptors: (*Concrete, Binders), (*Asphalt, Epoxy plastics), (*Epoxy plastics, Asphalt), Pavements, Jet engine fuels, Jet flames, Runways, Sand, Limestone, Specifications.

Field and laboratory tests were conducted on epoxy-asphalt concrete paving mixtures made with two types of epoxy resin (one for normal and one for cold climates), a flexibilizing additive, and asphalt. Primary purpose of the study was to develop a laboratory procedure for the selection of optimum binder content for epoxy-asphalt concrete mixtures. The mixtures were also tested in a field test section under jet blast and fuel spillage, and to compare the effectiveness of an epoxy-asphalt binder tack coat with that of a conventional asphalt tack coat. (Author)

AD-435 034 Div. 14, 26, 27
OTS price $1.60

Aerojet-General Corp., Sacramento, Calif.
DEVELOPMENT OF HIGH-STRENGTH IMPREGNATED ROVING FOR FILAMENT WINDING.
Bimonthly rept. no. 4, 11 Oct-10 Dec 63.
20 Feb 64, 16p. Rept. no. 0627V4
Contract NOw630627
Unclassified report

Descriptors: (*Filament wound construction, Rocket cases), (*Rocket cases, Glass textiles), Plastic coatings, Epoxy plastics, Vinyl plastics, Tensile properties, Rupture.

This is the fourth of a series of bimonthly reports describing progress in a program conducted to improve uniformity and strength utilization in preimpregnated roving for filament-wound rocket chambers. The work, is being conducted. (Author)

AD-435 044 Div. 14, 17
OTS price $5.60

Horizons Inc., Cleveland, Ohio.
REINFORCEMENT OF NICKEL CHROMIUM ALLOYS WITH SAPPHIRE WHISKERS.
Interim rept. no. 1, 28 Oct 63-28 Jan 64,
by Robert H. Kelsey and Mark S. Vukasovich.
17 Mar 64, 55p.
Contract NOw64 0125c
Unclassified report

Descriptors: (*Composite materials, Reinforcing materials), (*Ceramic fibers, Metals), Iron, Nickel, Chromium alloys, Nickel alloys, Single crystals, Sapphires, Aluminum compounds, Oxides, Cladding, Films, Tensile properties, Metalorgranic compounds, Titanium compounds.

Attempts to secure iron-alumina single crystal fiber composites having high fiber loading and exhibiting high strength reinforcement of the iron by inclusion of additives to the system prior to and during the fusion formation of the composite have not been successful. Additives have been presented as claddings on the fiber, as inclusions in the metal portion, and as special atmospheres during the melting of the metal phase. The inherent difficulties associated with high fiber loadings as opposed to low fiber loadings are described as being associated with both the chemical and physical aspects of composite formation. (Author)

15. MATHEMATICS

AD-433 472 Div. 15, 25
OTS price $9.10

Coordinated Science Lab., U. of Illinois, Urbana.
NONLINEAR OSCILLATIONS IN A SECOND ORDER SYSTEM,
by Peter James Ponzo. Jan 64, 107p. Rept. no. R193
Contract DA36 039AMC02208E, Proj. 3A99 25 004
Unclassified report

Descriptors: (*Oscillation, Nonlinear systems), Differential equations, Stability, Mechanics, Vibration, Motion, Trajectories.

Relaxation oscillations are investigated. A number of analytic curves are obtained which serve as upper and lower bounds on solution trajectories in this plane. In many cases, piecewise connection of such bounding curves provide annular regions within which periodic orbits lie. The number, location, stability and amplitude bounds of periodic solutions may be determined in this manner. When the method is applied to the equation of van der Pol, the upper and lower bounds obtained for the amplitude of the unique periodic solutions compare favourably with the known asymptotic expansion of the amplitude. (Author)

AD-433 474 Div. 15
OTS price $2.60

Mathematics Research Center, U. of Wisconsin, Madison.
A VALUE-REGION PROBLEM OCCURRING IN THE THEORY OF CONTINUED FRACTIONS,
by F. V. Atkinson. Dec 63, 30p. Rept. no. TSR419
Contract DA11 022ORD2059
Unclassified report

Descriptors: (*Continued fractions, Theory), Series, Sequences, Taylor series, Functions.

AD-433 475 Div. 15
OTS price $1.60

Mathematics Research Center, U. of Wisconsin, Madison.
THE ASYMPTOTIC EXPANSION OF THE OUTGOING SOLUTION OF DELTA + k2n2(x)u EQUALS DELTA (x) NEAR x EQUALS 0,
by G. S. S. Avila. Nov 63, 19p. TSR Rept. no. 442
Contract DA11 022ORD2059
Unclassified report

Descriptors: (*Boundary layer, Equations), Theory.

AD-433 476 Div. 15
OTS price $1.60

Mathematics Research Center, U. of Wisconsin, Madison.
WEAK CONVERGENCE IN CERTAIN SPECIAL BANACH SPACES,
by S. D. Chatterji. Dec 63, 20p. Technical summary rept. no. 443
Contract DA11 022ORD2059
Unclassified report

Descriptors: (*Functional analysis, Operators (Mathematics)), Measure theory, Topology, Linear systems, Special functions (Mathematics).

This report gives a theorem which provides a set of necessary and sufficient conditions to ensure the weak compactness of a set in the space of Bochner-integrable functions on a finite measure space taking values in a reflexive Banach space. The conditions and the proof are analogous to those in the scalar-valued case. Three other theorems and their proofs give preparatory material including a description of linear functionals on the space mentioned above and its weak completeness. (Author)

AD-433 486 Div. 15
OTS price $1.60

Harry Diamond Labs., Washington, D. C.
POLYNOMIALS OF E-X ORTHONORMAL IN THE REGION WHERE ZERO IS LESS THAN OR EQUAL TO X WHICH IS LESS THAN OR EQUAL TO INFINITY,

by N. Karayianis and C.A. Morrison. Mar 64, 17p.
HDL Proj. A0200
HDL TR1210 Unclassified report

Descriptors: (*Polynomials, Special functions (Mathematical)), Binomials, Taylor's series, Series, Determinants, Integrals.

AD-433 495 Div. 15, 7
OTS price $6.60

Coordinated Science Lab., U. of Illinois, Urbana.
GENERAL TOPOLOGICAL ANALYSIS OF LINEAR SYSTEMS,
by Wai-Kai Chen. Jan 64, 66p. Rept. no. R 191
Contract DA36 039AMC02208E, Proj. 3A99 25 004
Unclassified report

Doctoral Thesis.

Descriptors: (*Topology, Linear systems), (*Networks, Determinants), Conformal mapping, Electrical networks, Electrical impedance, Polynomials, Matrix algebra.

The material in this thesis can be divided into two major parts: the first part deals with methods of simplification of flow graphs, and the second part deals with general topological analysis of network determinants. It is shown that a general network determinant can be evaluated by means of directed trees and directed 2-trees. There is no sign problem. The products of such directed trees and directed 2-trees will automatically give the correct signs. Furthermore, this new method can be applied to either the node-admittance matrix or the loop-impedance matrix. Some applications of directed linear graphs, such as determining the stability of a system and inverting matrices, are also discussed (Author)

AD-433 511 Div. 15, 16
OTS price $1.60

System Development Corp., Santa Monica, Calif.
A GENERAL USE OF THE POISSON APPROXIMATION FOR BINOMIAL EVENTS, WITH APPLICATION TO BACTERIAL ENDOCARDITIS DATA,
by H. B. Eisenberg, R.R.M. Geoghagen and John E. Walsh. 24 Feb 64, 19p. Rept. no. SP1256 000 01
Unclassified report

Supersedes Rept. no. SP1256, AD-410 764.

Descriptors: (*Probability, Statistical distributions), (*Medical research, Statistical analysis), Binomials, Life span, Heart, Diseases, Bacteria, Experimental data.

For two special types of situations involving binomial events, some probabilistic prediction methods can be developed that seem to often be applicable. Let success and failure denote the possible outcomes for an event. Prediction of the total number of successes is considered for groups of events that are of at least moderately large sizes. For one of the special situations, the probabilities of success (not necessarily equal) are known to all be small. For the other type, all the failure probabilities are small. In both cases, a Poisson approximation to the probability distribution of the number of successes can often be used, even when mild dependence occurs among some of the events. Then, the problem of estimating the distribution from past data is reduced to that of estimating a single parameter; moreover, this parameter has an elementary interpretation. An estimation method is given that contains adjustment factors to allow for general changes that may have occurred since the past data were obtained. Groups of events where both types of special situations occur are also considered. (Author)

AD-433 524 Div. 15, 30
OTS price $1.60

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
SOME QUESTIONS ABOUT THE STATISTICAL DYNAMICS OF AUTOMATIC REGULATION SYSTEMS,
by Ye. I. Filippovich. 11 Feb 64, 18p.
FTD TT63 468 Unclassified report

Trans. from Avtomatizatsiya i Priborostroyeniye, Sbornik Nauchnykh Trudov, Gosudarstvennoye Izdatel'stvo Tekhnicheskikh Literatury USSR, Kiyev, no. 2, pp. 31-41, 1961.

Descriptors: (*Control systems, Automatic), (*Synthesis, Linear systems), Theory, Optimization, Fourier analysis, Integral transforms, Operators (Mathematics), Statistical analysis.

A problem is solved which is a generalization of the problem of Zaden and Ragazzini in the theory of the synthesis of linear systems of automatic control. Along with the solution of the formulated problem, methods are proposed which can be used when solving other analogous problems of the statistical theory of synthesizing optimal systems. (Author)

AD-433 528 Div. 15
OTS price $1.60

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
APPROXIMATE SOLUTION OF DIFFERENTIAL EQUATIONS WITH DEVIATING ARGUMENTS,
by N. V. Sharkova. 10 Feb 64, 17p.
FTD TT63 1034 Unclassified report

Trans. from Izvestiya Vysshikh Uchebnykh Zavedeniy, Matematika, No. 3, pp. 173-184, 1963.

Descriptors: (*Differential equations, Special functions (Mathematical)), Linear systems, Mathematical analysis, Nonlinear differential equations, Partial differential equations.

AD-433 595 Div. 15
OTS price $1.60

Air Force Cambridge Research Labs., Bedford, Mass.
ON THE THEORY OF BOOLEAN FORMULAS: MINIMAL INCLUDING SUMS, I,
by E. W. Samson and L. Calabi. Nov 63, 13p.
Proj. 4608
AFCRL 63 546I Unclassified report

Reprint from Jnl. of Soc. Indust. Appl. Math., 11:2, pp. 212-223, June 63. (Copies also available from DDC)

Descriptors: (*Algebras, Theory), (*Metamathematics, Functions), Operators (Mathematics), Algebraic topology, Switching circuits, Circuits, Series, Mathematical logic.

AD-433 599 Div. 15
OTS price $1.60

Air Force Cambridge Research Labs., Bedford, Mass.
ON THE THEORY OF BOOLEAN FORMULAS: MINIMAL INCLUDING SUMS, II,

by E. W. Samson and L. Calabi. Nov 63, 13p. Proj. 4608
AFCRL 63 546 Unclassified report

Reprint from Jnl. of Soc. Indust. Appl. Math. 11:2, pp. 224-234, June 63. (Copies also available from DDC)

Descriptors: (*Algebras, Theory), (*Metamathematics, Functions), Operators (Mathematics), Algebraic topology, Switching circuits, Circuits, Series, Mathematical logic.

AD-433 607 Div. 15
OTS price $1.10

Courant Inst. of Mathematical Sciences, New York Univ., N. Y.
AN APPROXIMATION THEOREM,
by Lipman Bers. Feb 64, 6p. Rept. no. IMM NYU317
Contract Nonr285 46
Unclassified report

Descriptors: (*Algebraic topology, Sequences), Functions, Linear systems, Measure theory, Probability.

The simple approximation theorem uses a device due to Ahlfors. (Author)

AD-433 626 Div. 15
OTS price $1.60

Institute for Mathmetical Studies in the Social Sciences, Stanford Univ., Calif.
ON THE GENERALIZED INVERSE OF AN INCIDENCE MATRIX,
by Yuji Ijiri. 31 Jan 64, 16p. Technical rept. no. 127
Contract Nonr22550, Proj. NR047 004
Unclassified report

Descriptors: (*Matrix algebra, Least squares method), Linear programming, Operations research, Management engineering, Optimization, Decision making, Control systems, Sequences.

The properties of the generalized inverse of an arbitrary incidence matrix are examined in connection with the properties of the corresponding directed graph. (Author)

AD-433 699 Div. 15, 32, 30
OTS price $1.60

Brown U., Div. of Applied Mathematics, Providence, R. I.
OPTIMAL PROGRAMS FOR SEQUENTIAL INVESTMENTS,
by David Gale. 1964, 14p. TR 1
Contract Nonr562 15
Unclassified report

Descriptors: (*Sequences, Optimization), Statistical analysis, Programming (Computers), Series, Money, Economics, Matrix algebra, Linear programming.

AD-433 814 Div. 15
OTS price $3.60

Coordinated Science Lab., U. of Illinois, Urbana.
LINEAR CONTROL LAWS FOR SINGULAR LINEAR SYSTEMS,
by Manoel Sobral. Jan 64, 40p. Rept. no. R188
Contract DA36 039AMC02208E, Proj. 3A99 25 004
Unclassified report

Descriptors: (*Linear systems, Optimization), Mathematical analysis, Equations.

For a class of quadrate performance indices the optimal control law is a combination of maximum effort (bang-bang) and singular. The singular control law is linear and it is optimal in a hyperplane in the n-demensional state-space. For practical purposes it is desirable to restrict the class of admissible control laws to be linear. This investigation presents a method of finding a linear control law which is optimal in the sense that it is the singular control law in the singular suface and the best possible linear law elsewhere. Classical calculus of variations and the more sophisticated maximum principle of Pontryagin are the mathematical tools used; the former provides a simple and straight forward method for obtaining the singular solutions while the latter is used to extend the linear singular law to the entire state-space. (Author)

AD-433 836 Div. 15
OTS price $2.60

System Development Corp., Santa Monica, Calif.
LEAST-SQUARES ESTIMATION OF PARAMETERS FOR ASYMPTOTES OF EXTREMES,
by John E. Waslh. 26 Feb 64, 21p. Rept. no. SP1566
Unclassified report

Descriptors: (*Sampling, Least squares method), Statistical analysis, Complex variables, Statistical distribution, Mathematical analysis, Numerical analysis.

Consider a specified one of the largest order statistics of a sample of size n from a continuous population. Suppose that its large sample distribution is known to be of an identified one of the three parametric types (called first, second, and third asymptotes) that occur for the sample case. One problem considered is estimation of the parameters of this asymptote on the basis of a sample of size N from the same population, where N is substantially larger than n. The other problem is to estimate the parameters of a specified smallest order statistic of a sample of size n. Development of a nonparametric estimate of the asymptotic distribution for an extreme furnishes the basis for the estimation. The parameters are determined so that there is as close an agreement as possible, in a modified least-squares sense, between the asymptote and the nonparametric estimate. (Author)

AD-433 869 Div. 15
OTS price $2.60

Stanford U., Calif.
PERCENTILE MODIFICATIONS OF TWO SAMPLE RANK TESTS,
by Joseph L. Gastwirth. 11 Feb 64, 27p. Technical rept. no. 95
Contract Nonr225 52, Proj. NR342 022
Unclassified report

Descriptors: (*Statistical tests, Statistical functions), Statistical distributions, Sampling.

A simple method is presented for increasing the efficiency of rank tests relative to the best tests for samples from normal distributions without using complicated scoring systems such as the normal scores tests. Two numbers p and r (0 is less than p, r is less than 1) are selected and then scored, with simple weights, the date in the upper pth and lower rth percentiles of the combined sample. This proposal is motivated by the fact that the optimum rank test for normal distributions places more weight on the

extreme ranks then on the central ones. The optimum values of p and r depend on the populations sampled. For most distributions, the efficiency, is near its maximum in a large neighborhood of the optimum choice of p and r. An advantage of the proposed test is that prior knowledge of any symmetry properties of the populations can be incorporated into the selection of p and r. The criterion used to compare tests is Pitman's efficiency. (Author)

AD-433 876 Div. 15
OTS price $2.60

Mathematics Research Center, U. of Wisconsin, Madison.
THE STRUCTURE OF THE SOLUTION SET FOR A GENERALIZED REDUCED HAUSDORFF MOMENT PROBLEM,
by E. B. Cobb and Bernard Harris. Jan 64, 22p. Technical summary rept. 453
Contract DA11 022ORD2059
Unclassified report

Descriptors: (*Statistical functions, Mathematical analysis), Topology.

The solution set for a generalized reduced Hausdorff moment problem is shown to be the closure of the convex hull of cumulative distribution functions with small spectra. (Author)

AD-433 877 Div. 15
OTS price $1.10

Mathematics Research Center, U. of Wisconsin, Madison.
ON THE ASYMPTOTIC JOINT NORMALITY OF QUANTILES FROM A MULTIVARIATE DISTRIBUTION,
by Lionel Weiss. Dec 63, 7p. Technical summary rept. 446
Contract DA11 022ORD2059
Unclassified report

Descriptors: (*Statistical distributions, Statistical functions), (*Statistical functions, Statistical distributions).

A simple proof is given of the asymptotic joint normality of sample quantiles from a multivariate population, under very mild conditions. The joint cumulative distribution function of the quantiles is studied, rather than the joint probability density function. (Author)

AD-433 878 Div. 15
OTS price $3.60

Mathematics Research Center, U. of Wisconsin, Madison.
DECISION PROCEDURES FOR FINITE DECISION PROBLEMS UNDER COMPLETE IGNORANCE,
by B. Harris, F. V. Atkinson and J. D. Church. Jan 64, 34p. Technical summary rept. 445
Contract DA11 022ORD2059
Unclassified report

Descriptors: (*Decision making, Game theory), (*Game theory, Decision making), Mathematical analysis, Mathematical models, Groups (Mathematics), Algebras, Theory, Statistical processes.

A set of desirable properties is developed for decision procedures for use in a decision problem under the hypothesis of complete ignorance. It is shown that there exists a family of decision procedures, each of which satisfies all required properties. An algorithm for determining optimal strategies is given. It is established that two very general classes of decision procedures fail to satisfy at least one of the required properties. These classes contain the minimax and minimax regret criteria, and Laplace's criterion as special cases. (Author)

AD-433 879 Div. 15
OTS price $1.60

Mathematics Research Center, U. of Wisconsin, Madison.
THEOREMS OF GERSGORIN TYPE,
by J. L. Brenner. Jan 64, 11p. Technical summary rept. 454
Contract DA11 022ORD2059
Unclassified report

Descriptors: (*Matrix algebra, Metamathematics), Polynomials, Complex numbers, Operators (Mathematics), Linear systems, Mathematical logic, Rings.

AD-433 881 Div. 15
OTS price $3.60

Mathematics Research Center. U of Wisconsin, Madison.
ON SUMS OF POWERS OF COMPLEX NUMBERS; AN IMPROVED ESTIMATE,
by F. V. Atkinson. Dec 63, 32p. Technical summary rept. 428
Contract DA11 022ORD2059
Unclassified report

Descriptors: (*Complex numbers, Algebra), Equations, Numerical analysis.

Given n complex numbers, of which at least one has modulus not less than unity, it is shown that for at least one k, where k is less than or equal to n and more than or equal to 1, the sum of the k-th powers of these numbers exceeds 1/3. This improves on earlier estimates of 1/6, or 1/5 for n greater than 8 pi. The problem has an application to the numerical solution of algebraic equations. (Author)

AD-433 914 Div. 15
OTS price $1.60

Numerical Analysis Research, Univ. of California, Los Angeles.
SIMPLIFIED PREDICTOR-CORRECTOR METHODS,
by M. Alan Feldstein and Hans J. Stetter. Aug 63, 15p.
Unclassified report

Presented at the 1963 ACM National Conference, Denver, Colo.

Descriptors: (*Mathematical predictions, Optimization), Game theory, Errors, Difference equations, Stability, Differential equations, Programming (Computers), Numerical methods and procedures.

AD-433 943 Div. 15
OTS price $5.60

Mathematics Research Center, Univ. of Wisconsin, Madison.
MULTIVARIATE SPECTRAL THEORY. PART I: THE LINKED EIGENVALUE PROBLEM FOR MATRICES,
by F. V. Atkinson. Jan 64, 55p. Technical summary rept. 431
Contract DA11 022ORD2059
Unclassified report

Descriptors: (*Simultaneous equations, Matrix algebra), Equations, Difference equations, Differential equations, Integral equations, Partial differential equations, Algebraic topology.

The series of papers deals with simultaneous eigenvalue problems concerning k equations, of differential or other type, with supplementary homogeneous conditions, involving k disposable parameters. The present part is devoted to the finite-dimensional analogue, in which there are k simultaneous equations in k vector spaces, connected by the presence in each of the same k paramenters. (Author)

AD-433 944 Div. 15
OTS price $2.60

Mathematics Research Center, Univ, of Wisconsin, Madison.
MATRICES SIMILAR ON A ZARISKI-OPEN SET,
by Jack Ohm and Hans Schneider. Feb 64, 21p. Technical summary rept. 449
Contract DA11 0220RD2059
Unclassified report

Descriptors: (*Matrix algebra, Algebraic geometry), Topology, Algebraic topology.

Theorems due to Wasow and Ostrowski concerning the similarity of matrices whose elements are holomorphic functions are generalized to the case of matrices whose elements lie in an arbitrary commutative integral domain. The chief tool for this generalization is the Zariski topology. The integral domain consisting of certain functions on a topological space is an interesting special case. (Author)

AD-433 945 Div. 15
OTS price $3.60

Mathematics Research Center, U. of Wisconsin. Madison.
NUMERICAL PROCEDURES FOR INTERPOLATION BY SPLINE FUNCTIONS,
by T. N. E. Greville. Jan 64, 32p. Rept. no. TSR450
Contract DA11 0220RD2059
Unclassified report

Descriptors: (*Numerical methods and procedures, Special functions (Mathematical)), Polynomials, Linear systems, Curve fitting, Functional analysis, Difference equation, Calculus of variations, Series, Sequences, Statistical distributions.

This report describes numerical procedures for interpolation by means of spline functions: that is, functions defined by piecewise polynomial arcs smoothly joined in such a way that derivatives are continuous everywhere up to an order one less than the degree of polynomials used. This is facilitated by Schoenberg and Whitney's unique representation of an arbitrary spline function as the sum of a polynomial and a linear combination of elementary spline functions of particularly simple form. A method for numerical determination of the DeBoor interpolation function is described, and an alternative representation of this function is the case of equally spaced data points is given. (Author)

AD-433 946 Div. 15
OTS price $2.60

Mathematics Reaeirch Center, Univ. of Wisconsin, Madison.
LATTICE-ORDERED SEMIGROUPS, GRAPHS AND AUTOMATA, by Michael Yoeli. Jan 64, 26p. Technical summary rept. 451
Contract DA11 0220RD2059
Unclassified report

Descriptors: (*Algebras, Groups (Mathematics)), Computers, Programming languages, Networks, Control sequences, Computer logic, Decision-making, Communication theory, Switching circuits, Artificial intelligence.

A W-semigroup is defined as a lattice-ordered semigroup with zero, the lattice of which is complete and in which multiplication is completely distributive over joins. This paper discusses W-nets, i.e. finite directed graphs the edges of which are labeled by elements of a W-semigroups. It unifies and extends various results concerning switching nets, communication nets, edge sequences in finite graphs, finite-state languages, nondeterministic automata, and derivatives (quotients) of regular expressions. (Author)

AD-433 947 Div. 15
OTS price $2.60

Mathematics Research Center, Univ. of Wisconsin, Madison.
NUMERICAL EVALUATION OF INTEGRALS AND SOLUTIONS OF INTEGRAL EQUATIONS,
by L. B. Rall. Feb 64, 25p. Technical summary rept. 461
Contract DA11 0220RD2059
Unclassified report

Descriptors: (*Equations, Numerical analysis), (*Integral equations, Numerical methods and procedures), Intergration, Errors, Linear systems, Nonlinear systems, Programming (Computers).

A method for numerical integration, based on the definition of the Riemann integral, gives approximations for which rigorous error bounds may be obtained automatically as a result of the computations. The same procedure is extended to integral equations, and it is shown that under certain conditions, the convergence of the approximating procedure guarantees the existence of a solution of the original problem, as well as giving approximate solutions with known error bounds. Applications of this method to linear and nonlinear integral equations are given. (Author)

AD-433 982 Div. 15
OTS price $2.60

Cruft Lab., Harvard Univ., Cambridge, Mass.
GENERATION OF QUADRATIC-TYPE LIAPUNOV FUNCTIONS FOR LINEAR TIME-VARYING SYSTEMS,
by K. S. Narendra and R. M. Goldwyn. 22 Nov 63, 25p. Technical rept. no. 421
Contract Nonr186616, Proj. NR372 012
Unclassified report

Descriptors: (*Special functions (Mathematical), Linear Systems), Time, Stability, Feedback, Control sequences, Analytic geometry, Motion.

In this report the existence of Common Liapunov Functions (CLF'S) for linear time-varying systems is discussed. For a negative feedback system with G (s) in the forward path and a gain k (t) in the feedback path, it is shown that a sufficient condition to ensure the existence of CLF and hence stability is that 1/k + G(s) be a positive real function. For specific time-varying systems, Liapunov functions that are explicit

functions of time are found to increase the stability range of a parameter over that given by the CLF. An analysis of the behavior of the Liapunov function V in the V-V phase plane yields further insight into the problem of stability and leads to the generation of Liapunov functions for an additional class of time-varying systems. In the final section this approach is compared with the well-known Floquet Theory for periodic systems. (Author)

AD-434 020 Div. 15, 30
OTS price $1.60

System Development Corp., Santa Monica, Calif.
SOME EXAMPLES OF STOCHASTIC DISTORTION, A MONTE CARLO TECHNIQUE,
by E. L. Pugh. 6 Mar 64, 19p. Rept. no. SP 584
Unclassified report

Descriptors: (*Monte Carlo method, Distortion), Statistical distributions, Statistical functions, Statistical processes, Sampling, Probability, Optimization, Programming (Computers).

The effects of stochastic distortion on the sampling variance of a Monte Carlo estimation of tail probabilities are presented for both the exponential and the gamma distributions. Also presented is the effect of the distortion on the required sample size for a desired accuracy-confidence statement. (Author)

AD-434 059 Div. 15
OTS price $2.60

Stanford U., Calif.
THE CONVERGENCE OF A RANDOM DISTRIBUTION FUNCTION ASSOCIATED WITH A BRANCHING PROCESS,
by P. E. Ney. 12 Mar 64, 26p. Technical rept. no. 96
Contract Nonr 22552, Proj. NR342 022
Unclassified report

Descriptors: (*Statistical functions, Statistical processes), Mathematical models, Probability, Integral equations, Nonlinear systems, Cascade structures, Stochastic processes.

A general branching process is constructed from the standard one by associating with each particle a ''type'', namely a point in a space which is taken to be d-dimensional Euclidian space. At any given time, each particle existing at that time is to be considered as located at a point in the given space. The diffusion of the particles throughout the space is shieded. The branching character of the process alone implies detailed results about its asymptotic behavior, without requiring any specific distribution assumptions. (Author)

AD-434 106 Div. 15
OTS price $11.00

Aerojet General Corp., Downey, Calif.
METHODS OF DESCRIBING DROPLET-SIZE DISTRIBUTIONS FROM ATOMIZED SOLUTIONS,
by R. E. Brown and K. L. Leonard. 5 Mar 64, 149p. Rept. no. 0395 04 15SP
Contract DA18 108 405cm1829
Unclassified report

Descriptors: (*Atomization, Liquids), (*Liquids, Atomization), (*Mathematical models, Atomization), Solutions, Drops, Distribution, Particle size, Mathematical analysis, Probability, Aerosols.

Several mathematical methods were investigated to determine a technique for describing droplet-size distributions produced by pneumatic atomization. The Weibull and Logarithm (Log)-Probability functions have been shown to be reasonably successful in describing these distributions. Data from forty-three experiments and the standard deviation of the experimental results from the theoretical curves for both the mass and the frequency distributions are reported. These results show that the Weibull and Logarithm-Probability functions describe the frequency distribution with the same degree of accuracy; the Weibull function, however, describes the mass distribution much better than does the Log-Probability function. (Author)

AD-434 113 Div. 15
OTS price $3.60

University of Southern California, Los Angeles, Engineering Center.
EVALUATION OF COMPLEX ORDER HANKEL FUNCTIONS,
by C. Yeh. Jan 64, 34p. Rept. nos. 82 215, EE33
Contract AF19 604 6195, Proj. 4642, Task 464202
AFCRL 64 96 Unclassified report

Descriptors: (*Special functions (Mathematical), Tables), Bessel functions, Complex numbers, Programming (Computers), Electromagnetic waves, Acoustics, Spheres, Cylindrical bodies.

Computation of complex order Hankel function and its derivative was carried out. Results are tabulated to four significant figures. (Author)

AD-434 120 Div. 15
OTS price $5.60

Litton Systems, Inc., Waltham, Mass.
SOME OBSERVATIONS ON MEASURABLE PROPERTIES OF RANDOM PROCESSES AND FIELDS. I,
by David Middleton. 16 Mar 64, 54p. Rept. no. TR63 4BF
Contract Nonr3320 00
Unclassified report

Descriptors: (*Stochastic processes, Mathematical predictions), Probability, Statistical functions, Statistical processes, Statistical tests, Underwater, Measurement, Sampling, Communication theory, Series.

A number of useful, measurable properties of random processes and random fields are defined and discussed, and it is shown how these results may be applied to observations necessarily finite in time and in space. Time and space stationarity and ergodicity are considered, as are the definition and construction of hierarchies of probability distribution (densities) defining these stochastic processes and fields. The notion of the intensity spectrum in one or more dimensions is introduced, along with extended versions of the Wiener-Khintchine theorem relating the spectrum to the covariance functions. Cross- and auto-spectral densities are also briefly treated. Some tests of practical stationarity and homogeneity are suggested for finite data sets and single representations, from which approximately statistical (or regular) properties of the ensemble as a whole may be deduced. (Author)

AD-434 208 Div. 15
OTS price $6.60

Stanford Univ., Calif.
PROBLEMS IN PROBABILITY OF A GEOMETRIC NATURE,

by Bradley Efron. 1 Apr 64, 69p. Technical rept. no. 97
Contract Nonr225 52, Proj. NR342 022
Unclassified report

Descriptors: (*Probability, Algebraic geometry), (*Game, theory, Search theory), Geometry, Statistical functions, Mathematical prediction, Series, Combinatorial analysis, Decision making, Statistical tests, Algebraic topology.

AD-434 210 Div. 15
OTS price $3.60

California Univ., Berkeley.
ALMOST PERIODIC SURFACES,
by John Glen Marica. Jan 64, 33p.
Contract Nonr222 88
Unclassified report

Descriptors: (*Differential equations, Perturbation theory), Integrals, Transformations (Mathematics), Algebraic topology, Oscillation, Nonlinear systems, Nuclear energy, Quantum mechanics, Sequences.

This paper concerns systems of k=n+m ordinary differential equations. Under suitable hypotheses a surface given by m functions of n+1 variables, which is made up entirely of solutions of the system as has certain stability properties exists. The functions are allowed to be almost periodic in the time variable and the resulting surface is called an almost periodic surface. It is shown that the existence of an almost periodic surface, is equivalent to ythe existence of a fixed point for a certain transformation defined on the space of parameterizing functions. Conditions under which the transformation has a fixed point are given. The methods and results are similar to those of Hale, and Bogoliubov and Mitropolski, the essential difference being that in these results the corresponding matrix is diagonal. In both cases these results are applied to more general systems. A more careful comparison of the two results is given. (Author)

AD-434 225 Div. 15
OTS price $1.60

Naval Postgraduate School, Monterey, Calif.
A COMPARISON BETWEEN SOME METHODS FOR COMPUTING OPTIMUM PATHS IN THE PROBLEM OF BOLZA,
by Frank D. Faulkner. Mar 64, 13p.
NPS RP43 Unclassified report

Paper presented at Conference in Computing Methods in Optimization Problems on Jan 64, at California Univ., Los Angeles.

Descriptors: (*Optimization, Calculus of variations), (*Programming (Computers), Optimization), Trajectories, Ascent trajectories, Differential equations, Control systems, Scheduling.

A comparison is made between methods for calculating optimum trajectories in the problem of Bolza. For the most part the comparison is between the method of steepest ascent as given by Bryson and Denham and a direct method due to the author, using the differential techniques which G. A. Bliss developed during World War I in ballistics. A second purpose of the paper is to give a modification of Bryson and Denham's method which eliminates one of the minor subproblems and makes it possible to use a trajectory obtained by their method to start the routine for the other method. The reason for this is given. (Author)

AD-434 242 Div. 15
OTS price $5.60

Massachusetts Inst. of Tech., Cambridge.
SEMI-MARKOVIAN CONTROL SYSTEMS,
by Ronald A. Howard. Dec 63, 57p. Technical rept. no. 3
Contract Nonr1841 87
Unclassified report

Report on Research in the Control of Complex Systems.

Descriptors: (*Control systems, Statistical processes), (*Management engineering, Mathematical models), Decision making, Optimization, Maintenance, Money, Economics, Operations research, Scheduling, Control sequences, Stochastic processes, Probability.

A discussion is presented of a statistical model useful in analyzing a wide variety of common problems, problems in the areas of maintenance, replacement, marketing, finance, and inventory control. The basis for the present model is a decision model developed for strictly Markov processes, characterized as processes in which the main interest is on state transitions rather than on the time required for a transition. Other types of transition behavior was encouraged by the development of the semi-Markov process which allowed the time between transitions to be a random variable conditional on the transition made. A semi-Markov process has the same limiting state probabilities as an exponential Markov process with the same mean times for transitions, so the decision model can be extended to the semi-Markov process. Some of the results of this development are pointed out and it is shown how this increase in generality does not exact a computational penalty. (Author)

AD-434 254 Div. 15
OTS price $9.60

California Univ., Los Angeles.
REPEATED EXTRAPOLATION TO THE LIMIT IN THE NUMERICAL SOLUTION OF ORDINARY DIFFERENTIAL EQUATIONS,
by William Bryant Gragg. Jan 64, 111p.
Unclassified report

Doctorial thesis.

Descriptors: (*Differential equations, Numerical methods and procedures), Numerical analysis, Sequences, Series, Taylor's series, Errors, Metamathematics, Mathematical logic.

Let the initial-value problem for a system of differential equations be solved numerically by a one-step method or by a linear multistep method. There results a family of sequences which approximate the exact solution at the mesh points. Under suitable regularity conditions it is proved that the family of sequences has an asymptotic expansion. The results provide a rigorous justification for the algorithm of repeated extrapolation to the limit in which successive terms of the expansion for the error are removed by making use of the knowledge of the approximate solutions. The convergence properties of the algorithm are discussed in some generality and the theory is verified experimentally for a number of classical numerical methods. (Author)

Division 15 - MATHEMATICS

AD-434 256 Div. 15
OTS price $1.60

Numerical Analysis Research, Univ. of California, Los Angeles.
SIMPLIFIED PREDICTOR-CORRECTOR METHODS,
by M. Alan Feldstein and Hans J. Stetter.
Aug 63, 15p.
Unclassified report

Presented at the 1963 ACM National Conference, Denver, Colo.

Descriptors: (*Differential equations, Numerical methods and procedures), Programming (Computers), Optimization, Difference equations, Stability, Numerical analysis, Integration, Errors, Mathematical prediction.

AD-434 355 Div. 15
OTS price $1.10

Brown U., Div. of Applied Mathematics, Providence, R. I.
EXTENSIONS TO THEORY OF TIME-SERIES ANALYSIS.
Quarterly rept. no. 6, 1 Nov 63-31 Jan 64,
by Walter Freiberger. 31 Jan 64, 9p.
Contract DA36 039sc87222, Proj. 3A99 25 002
Unclassified report

Descriptors: (*Mathematical prediction, Optimization), (*Time, Series), Theory, Metamathematics, Mathematical logic, Partial differential equations, Probability, Stochastic processes, Errors.

The problem of the prediction of random fields from incomplete information has been explored. A field characterised by a function u(x,t) depending upon a space variable x and time is considered. The field is governed by a linear partial differential equation with constant coefficients and of hyperbolic type. If the field and derivative have been observed in a domain, the hyperbolic equation is used to predict the exact future evolution of the field in some domain of influence usually depending upon time. (Author)

AD-434 414 Div. 15
OTS price $2.60

Aerojet-General Corp., Sacramento, Calif.
SKEWED LOAD-STRENGTH DISTRIBUTION IN RELIABILITY,
by Eberhard H. Baur. 10 Feb 64, 23p. Rept. no. 9200 6 64
Unclassified report

Descriptors: (*Design, Loading (Mechanics)), (*Loading (Mechanics), Distribution), (*Reliability, Probability), Failure (Mechanics), Sampling, Mathematical prediction, Rocket motors (Solid propellant).

In this report, it is shown how the problem of determining skewed load and strength distributions can be solved. The skewed distributions are restricted to a class where only one maximum (mode) appears, and the left as well as the right side from the mode have normal shapes. Further, it is known for both distributions, on which side of the median the mode lies. A procedure is developed whereby a mathematical approximation for the skewed distribution from a given sample is obtained. After the skewed load and strength distributions are mathematically described, an integration procedure for the calculation of the percentage of failure is shown. (Author)

AD-434 453 Div. 15
OTS price $8.60

North Carolina State Coll. School of Physical Sciences and Applied Mathematics, Raleigh.
THE CONSTRUCTION OF PERIODIC SOLUTIONS OF NONLINEAR OSCILLATORS,
by J. H. Heinbockel and Raimond A. Struble.
Mar 64, 91p.
Grant DA AROD31 124G450
AROD 4105 6 Unclassified report

Descriptors: (*Oscillators, Nonlinear systems) Machines, Electrical networks, Nonlinear differential equations, Damping, Vibration.

Periodic solutions of nonlinear oscillators are investigated using elementary geometrical and analytical arguments. The existence of normal trajectories is established using geometrical arguments and the usual periodicity condition is rephrased so as to permit the use of simple continuity arguments in establishing the periodicity. Some preliminary concepts, as well as a basic theorem and three corollaries concerning the existence of periodic solutions, are introduced. Existence of normal trajectories is discussed. Estimates of elapsed times and the standard existence problem are considered. The general case is discussed and an examination of higher dimensional systems is presented. Certain connections with special concepts which have been employed by other investigators are established. Using these concepts the main results are included in a General Theorem which covers the higher dimensional cases. Throughout the Duffing equation serves as a concrete example. (Author)

AD-434 561 Div. 15
OTS price $9.10

Rand Corp., Santa Monica, Calif.
NUMERICAL STUDIES OF A TWO-POINT NONLINEAR BOUNDARY VALUE PROBLEM USING DYNAMIC PROGRAMMING, INVARIANT IMBEDDING, AND QUASILINEARIZATION,
by R. E. Bellman, H. H. Kagiwada and R. E. Kalaba. Mar 64, 97p. Memo. no. RM4069PR
Contract AF49 638 700
Unclassified report

Descriptors: (*Boundary value problems, Mathematical analysis), (*Programming (Computers), Optimization), Algebra, Orbital trajectories, Control systems, Guidance, Transport properties.

The theories of quasilinearization, dynamic programming and invariant imbedding are applied to the numerical solution of a single variational problem. Their advantages and disadvantages are discussed, and FORTRAN programs and numerical results are included. (Author)

AD-434 564 Div. 15
OTS price $2.60

Harry Diamond Labs., Washington, D. C.
SOME USEFUL NOTIONS IN LINEAR VECTOR SPACES,
by N. Karayianis. 16 Mar 64, 27p.
Proj. A0200
HDL TR1187 Unclassified report

Descriptors: (*Operators (Mathematics), Linear systems, Algebraic topology, Groups (Mathematics), Matrix algebra.

Three notions regarding operators in a linear vector space are introduced: (1) the order of an element x with respect to an operator A; (2) a null-preserving operator; and (3) an order-

preserving operator. Several theorems are proved regarding these concepts, the most significant of which is theorem 8, which is the outgrowth, primarily, of the null-preserving notion. It characterizes operators of simple structure, i.e., operators whose eigenvectors span the linear vector space. Such operators constitute a larger class than the so-called normal operators whose eigenvectors are known to form an orthogonal basis in the space. The notion of an order-preserving operator is investigated very briefly, and a possible application in the investigation of the symmetric group is suggested. (Author)

AD-434 577 Div. 15
OTS price $2.60

Rome Univ. (Italy).
ON CALCULATION OF THE BETTI NUMBERS OF A DIFFERENTIABLE MANIFOLD WHICH IS KNOWN ONLY BY ONE OF ITS ATLASSES,
by M. P. Colautti. 20 Feb 64, 21p. Technical note no. 1
Grant AF EOAR63 91
Unclassified report

Descriptors: (*Numbers, Sequences), Mapping, Topology, Transformations (Mathematics), Integral equations.

This work provides a method for the calculation of the Betti numbers of a differentiable manifold which is compact and orientable, and which is known only by means of one of its atlasses. A system of maps and of passage homeomorphisms from one map to another is given. It is shown how the atlas uniquely determines the manifold. The solution of the problem uses only procedures which can always be carried out numerically, in spite of being somewhat complicated analytically. Moreover, in calculation of the quantities which occur in the solution of the problem, we shall use only elements provided by our knowledge of the atlas. The calculation of the numbers involves the determination of a numerical sequence whose terms are constructed using the above criteria. It is shown that this sequence converges. (Author)

AD-434 666 Div. 15, 25
OTS price $5.60

Uppsala U. (Sweden).
INDUCED REPRESENTATIONS WITH APPLICATIONS TO THE SYMMETRIC AND FULL LINEAR GROUPS,
by A. J. Coleman and C. J. Bradley. 1 July 63, 57p. Technical note no. 102
Contract AF61 052 351
ARL 63 247 Unclassified report

Descriptors: (*Groups (Mathematics), Topology), Linear systems, Combinatorial analysis, Matrix algebra, Determinants, Polynomials, Tensor analysis, Theory.

The theory of induced representations in group theory is reviewed.

AD-434 715 Div. 15
OTS price $3.60

Arcon Corp., Lexington, Mass.
A METHOD FOR COMPUTING LEAST SQUARES ESTIMATORS THAT KEEP UP WITH THE DATA,
by Arthur Albert and Robert W. Sittler. Feb 64, 34p.
Contract Nonr440100, Proj. RR003 04 01
Unclassified report

Descriptors: (*Least squares method, Theory), Analysis of variance, Sequential analysis, Recursive functions, Matrix algebra, Fourier analysis, Linear programming.

AD-434 782 Div. 15, 30
OTS price $2.60

Operations Research Center U. of Calif., Berkeley.
NOTES ON OPERATIONS RESEARCH-2.
27 Sep 63, 29p. Rept. no. 63 23 RN 4
Contract Nonr22283
Unclassified report

Descriptors: (*Linear programming, Projective geometry), Optimization, Networks, Functions, Polynomials, Scheduling, Operations research, Transportation, Management engineering.

AD-434 803 Div. 15
OTS price $3.00

Radio Corp. of America, Camden, N. J.
A QUEUING MODEL FOR DETERMINING SYSTEM MANNING AND RELATED SUPPORT REQUIREMENTS.
Rept. for June 62-Dec 63,
by H. R. Barton, R. E. Purvis, J. E. Stuart and W. K. Mallory. Jan 64, 166p.
Contract AF33 657 9439, Proj. 1710, Task 171006
AMRL TDR64 21 Unclassified report

Report on Training Personnel, and Psychological Stress Aspects of Bioastronautics.

Descriptors: (*Quenueing theory, Models (Simulations)), Linear programming, Training, Maintenance, Mathematical models, Determination, Analysis, Costs.

Increasing need for earlier estimates of manning, skills and training requirements led to the development of mathematically sophisticated techniques capable of computing and assessing requirements at every phase of system development. Current methods are largely intuitive, rely on bookkeeping procedures, and are seldom applicable at pre-hardware stages of system development. Needed was a method for making trade-offs when investigating alternatives in system design. The method presented here begins with an analysis of hardware functions and develops human requirements in terms of operational needs and service rates. Manning and skill requirements are integrated over such factors as desired operational readiness, schedules of mission frequency, various environmental demands, maintenance concepts and procedures, and training requirements. Two mathematical techniques; queuing theory and linear programming, are used to compute manning requirements and training needs. In practice, failed systems or units piled up in lines waiting for service, or else men are incompletely utilized. Queuing tables permit trade-offs between men, skill levels, sparing levels and downtime with given values for operational readiness. The Simplex algorithm permits trade-offs and optimal determination of training needs for given policies of phaseover and training cost. (Author)

AD-434 807 Div. 15
OTS price $2.60

Operations Research Center, U. of Calif., Berkeley.
ON A PROBLEM OF OPTIMUM PRIORITY CLASSIFICATION,

by Robert M. Oliver and Gerold Pestalozzi.
30 Dec 63, 26p. Rept. no. 63 29RR
Contract Nonr222 83, Grant G21034
Unclassified report

Descriptors: (*Logistics, Mathematical models), (*Management engineering, Queueing theory), Traffic, Storage, Probability, Statistical processes, Optimization, Operations research, Decision making.

In certain traffic and storage operations many types of customers use a common service facility. At an airport runway, for example, landings and departures may consist of many types and sizes of propeller and jet aircraft, each with different service characteristics. It is often possible to assign each customer to a priority class n = 1, 2,...,N + 1 and devise an ordered servicing rule, as a function of n, which leads to better performance of the service system than could be expected if customers were serviced in the order of their arrival. (Author)

AD-434 872 Div. 15
OTS price $1.80

Cruft Lab., Harvard U., Cambridge, Mass.
ON THE PARTIAL DIFFERENTIAL EQUATION FOR THE CONDITIONAL PROBABILITY DISTRIBUTION FOR NONLINEAR DYNAMIC SYSTEMS WITH NOISY MEASUREMENTS,
by R. L. Kashyap. 2 Dec 63, 20p. TR 432
Contract Nonr186616, Proj. NR372 012
Unclassified report

Descriptors: (*Stochastic processes, Partial differential equations), Probability, Statistical distributions, Nonlinear systems.

The partial integro-differential equation is derived for the conditional probability density distribution of the output of a nonlinear system excited by nonadditive white Gaussian noise, with nonlinear measurements corrupted by white Gaussian noise. This equation reduces to the well-known Kolmogoroff forward equation when there are no measurements. The usefulness of the differential equation is demonstrated by deriving from it, for linear systems, the Wiener-Kalman filter. (Author)

AD-434 898 Div. 15
OTS price $3.60

Stanford U., School of Humanities and Sciences, Calif.
NUMERICAL SOLUTION OF BOUNDARY-VALUE PROBLEMS BY THE METHOD OF INTEGRAL OPERATORS,
by Stefan Bergman and John G. Herriot. 28 Feb 64, 35p. Rept. no. CS4
Unclassified report

Descriptors: (*Boundary value problems, Numerical methods and procedures), Integrals, Operators (Mathematics), Partial differential equations, Integral equations, Energy, Programming languages, Tables.

AD-435 039 Div. 15
OTS price $3.60

Carnegie Inst. of Tech., Graduate School of Industrial Administration, Pittsburgh, Pa.
ON THE ALGORITHMS OF SZWARC AND FEDEROWICZ FOR LINEAR PROGRAMMING PROBLEMS WITH BOOLEAN VARIABLES,
by Robert Connelly. Sep 63, 37p. Rept. no. ONR RM 115
Contract Nonr760 01, Proj. NR047011
Unclassified report

Descriptors: (*Linear programming, Costs), Scheduling, Groups, Convex sets, Algebraic topology.

In this paper, Federowicz proposes an algorithm for solving the fixed cost linear programming problem where the problem is the same as in the linear programming problem except that in the objective function there is a fixed cost associated with turning a variable on. It is the purpose of this paper to summarize this method and another one solving a closely related problem and to compare the two. Federowicz's problem is a special case of the other problem so a generalization of this problem is presented. (Author)

16. MEDICAL SCIENCES

AD-433 521 Div. 16
OTS price $1.10

Army Medical Research and Nutrition Lab., Denver, Colo.
THE EXCRETION OF LIPID AND LIPID SUBSTANCES IN HUMAN SWEAT,
by C. Frank Consolazio, Le Roy O. Matoush, Richard A. Nelson and Gilbert A. Leveille.
13 Nov 63, 9p.
Proj. 3A012501B813, Task 03
AMRNL R280 Unclassified report

Descriptors: (*Lipids, Excretion), (*Perspiration, Lipids), Environmental tests, Temperature, Metabolism, Cholesterol, Phosphorus.

The primary objective of this study was to determine whether the losses of lipid substances in sweat, under conditions of profuse sweating, were of significance. Under the conditions of this study at high enviromental temperatures, the total excretion of lipid substances in sweat was low and would not seem to be of consequence in studies of lipid metabolism. During a 7 1/2 hour exposure period at high temperatures, the total lipid excretion in sweat ranged between 25 and 46 mg. As one would expect, since the total lipid excretion in sweat was low, the excretion of cholesterol, free and total, and lipid phosphorus were also low. (Author)

AD-433 529 Div. 16
OTS price $3.60

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
THE BIOLOGICAL ACTION OF HIGH ENERGY FAST NEUTRONS AND PROTONS,
by Yu I. Moskalev, I. K. Petrovich and V. N. Strel'tsova. 23 Jan 64, 31p.
FTD TT63 1049 Unclassified report

Trans. from Biologicheskoye Deistviye Bystrykh Neytronov I Protonov Vysokikh Energiy, Simpozium Po Biologicheskomy Vozdeystviya Neytronnykh Obluchenіy, SM-44/58, pp. 1-33, 7-11 Oct 63.

Descriptors: (*Fast neutrons, Radiobiology), (*Protons, Radiobiology), (*Radiobiology, Nuclear reactions), Radiological dosage, Radiation effects, Lethal dosage, Pathology, Neoplasms, Rats, Survival, Analysis of variance, Leukemia, Blood, Hemopoietic system.

AD-433 537 Div. 16
OTS price $1.60

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
LATEST EXPERIMENTAL DATA ON THE ETIOLOGY OF LEUKOSES,
by V. M. Bergol'ts. 20 Feb 64, 16p.
FTD TT63 1171 Unclassified report

Trans. from Uspekhi Sovremennoy Biologii, 47:3, pp. 390-396, 1959.

Descriptors: (*Leukocytes, Radiation effects), Etiology, Radioactive fallout, Viruses, Edema, Necrosis, Nucleic acids, Mice.

AD-433 546 Div. 16
OTS price $1.10

Stanford Univ., Calif School of Medicine.
EFFECT OF CHRONIC HYPOXIA UPON THE CIRCULATION.
Annual progress rept., 1 Mar 63-29 Feb 64,
by Herbert N. Hultgren. 10 Mar 64, 7p.
Contract DA49 193md2274
Unclassified report

Descriptors: (*Physiology, High altitude), (*Hypoxia, Blood circulation), (*High altitude, Cardiovascular system), Edema, Heart, Oxygen consumption, Therapy.

AD-433 549 Div. 16
OTS price $2.60

Marine Lab., Univ. of Miami, Coral Gables, Fla.
ACTIVITIES OF HYDROGENASE IN MARINE ENVIRONMENTS AND THE CORROSION OF IRON.
Annual progress rept.,
by Carl H. Oppenheimer, Charles Willingham and R. Beal. 1963, 27p.
Contract Nonr4008 06, Proj. NR103 543
ML 64088 Unclassified report

Descriptors: (*Marine biology, Microorganisms), (*Bacteria, Enzymes), (*Enzymes, Corrosion), (*Corrosion, Iron), Culture media, Water, Wood, Metals, Sand.

Data reported in earlier progress reports have shown that certain marine bacteria, one strain of Desulfovibrio sp. and a facultatively anaerobic pseudomonad, promote the corrosion of iron. These two organisms were used in further studies, the results of which have implicated the enzyme, hydrogenase, as possibly being responsible for the depolarization and resulting corrosion of metallic iron in the anaerobic environment. In an effort to acquire a broader spectrum of organisms which might show similar corrosive properties, emphasis has been placed on obtaining enrichment cultures from samples taken from various marine environments. Substrates examined to date can be devited into five basic types: (1) water; (2) sediments and muds; (3) sand; (4) metals; (5) wood. (Author)

AD-433 574 Div. 16
OTS price $7.60

Whirlpool Corp., St. Joseph, Mich.
HUMAN WASTE COLLECTION AND STORAGE DURING AEROSPACE FLIGHT.
Rept. for 1 June 62-20 May 63,
by Norman G. Roth, John J. Symons, Dave Cohen and Robert B. Wheaton. Feb 64, 78p.
Contract AF33 657 9131, Proj. 6373, Task 637305
AMRL TDR64 3 Unclassified report

Equipment for Life Support in Aerospace.

Descriptors: (*Urine, Collecting methods), Secretion, Storage, Odors, Containers, Microorganisms, Sanitary engineering, Pathology, Bags (Containers), Wastes (Sanitary engineering).

AD-433 610 Div. 16
OTS price $8.10

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
BIOLOGICAL RHYTHMS AND ASTRONAUTICS,
by Yu. Fedotor and Ye. Yudin. 3 Mar 64, 8p.
FTD TT64 26 Unclassified report

Trans. from Krasnaya Zvezda, No. 212 (11817), p.6, 8 Sep 62.

Descriptors: (*Biology, Rhythm (Biology)), (*Astronauts, Rhythm (Biology)), Physiology, Hormones, Secretion, Blood pressure, Respiration, Cardiovascular systems, Psychology, Temperature, Diurnal variations, Periodic variations.

AD-433 628 Div. 16
OTS price $1.60

Naval Dental School, Bethesda, Md.
ABSTRACTS OF RESEARCH REPORTS OF PROJECTS COMPLETED IN PARTIAL FULFILLMENT OF REQUIREMENTS OF THE GENERAL POSTGRADUATE COURSE.
Jun 63, 12p.
Unclassified report

Descriptors: (*Dentistry, Medical research), (*Abstracts, Dentistry), Electroforming, Dies, Cements, Silicates, Teeth, Radiation effects, Surgical instruments, Tin compounds, Fluorides, Effectiveness, Calcium compounds, Phosphates, Medical equipment, Fluorescence, Diagnosis, Diseases.

AD-433 659 Div. 16, 20
OTS price $.75

Electronics Research Lab., U. of Calif., Berkeley.
BIOLOGICAL USES OF NONIONIZING RADIATION.
Annual scientific rept. for 1962-1963,
by C. Susskind and P. O. Vogelhut. 31 Oct 63, 30p. Rept. no. 63 27
Contract Nonr222 92
Unclassified report

Descriptors: (*Biology, Electronics), (*Electrical properties, Nervous system), Bionics, Instrumentation, Transport properties, Microwave frequency, Measurement, Hall effect, Protons, Test methods, Molecular structure, Diodes (Semiconductors).

Research in bioelectronics was carried out in the following areas: Hall effect in water and ice, protonic semiconductors, and electromagnetic effects on the nervous system. Both theoretical and experimental investigations were undertaken. Hall-effect measurements by the Faraday-rotation method have proved to be unsatisfactory. Study of protonic semiconductor has led to the development of a rectifying (diode) junction with interesting properties. The method of accurate and rapid dielectric-constant measurements developed during a previous study has been applied to measurements of changes in the electrical properties of nerves during transmission of action potentials. (Author)

AD-433 663 Div. 16
OTS price $5.60

Linde Co., Div. of Union Carbide Corp., Tonawanda, N. Y.
DEVELOPMENT OF PROCEDURES FOR THE LOW-TEMPERATURE PRESERVATION OF BLOOD.
Progress rept., June-Nov 63,
by A. P. Rinfret. 6 Mar 64, 51p.
Contract Nonr3003 00
Unclassified report

Descriptors: (*Blood, Preservation), (*Low temperature research, Blood), Erythrocytes, Additives, Biochemistry, Physiology, Cells (Biology), Viability, Hemoglobin.

AD-433 674 Div. 16
OTS price $1.60

Naval Research Lab., Washington, D. C.
A FORCE-AREA STUDY OF MIXED FILMS OF TRYPSIN AND OVOMUCOID.
Final rept.,
by J. D. Bultman and J. M. Leonard. 17 Feb 64, 11p.
Proj. RR007 08 44 5503
NRL 6035 Unclassified report

Descriptors: (*Trypsin, Inhibition), (*Surface active substances, Monomolecular films), Glycoproteins, Reaction kinetics, Surface properties.

An investigation of the surface chemical behavior of the enzyme-inhibitor complex between ovomucoid and trypsin was undertaken. Monomolecular films of this complex were deposited on ammonium sulfate substrate solutions of pH 4.0 and pH 7.0. Spreading solutions were employed in which the molecular ratios between trypsin and ovomucoid (T:O) were close to 3:1, 1:1, and 1:3. (Author)

AD-433 770 Div. 16
OTS price $1.10

Michigan U., Ann Arbor.
ISOLATION, IDENTIFICATION AND PHYSIOLOGY OF A POSTULATED HORMONE CAPABLE OF INDUCING EXCRETION OF SODIUM,
Annual progress rept., 1 Mar 63-29 Feb 64,
by J. W. Conn. 29 Feb 64, 7p.
Grant DA MD49 193 62 G62
Unclassified report

Descriptors: (*Sodium, Excretion), (*Hormones, Physiology), Identification, Purification, Rats, Therapy, Metabolism.

Intramuscular administration of aldosterone to normal subjects produces an initial period of sodium and water retention, followed by the so-called 'escape' from retention. At this time there is a supranormal rate of urinary sodium excretion (UNaV) in response to an intravenous infusion of physiological saline. Three subjects were studied after simultaneous administration of antidiuretic hormone (ADH) and aldosterone. The rate of sodium excretion was 1.24±.22 mEq/min. Similar results were obtained after acute intravenous ADH infusion or chronic intramuscular pitressin therapy. When oral water load preceded the saline infusions, aldosterone resulted in the usual bimodal effect on sodium excretion. The results are compitible with the concept of hormonal control of the mechanism of escape, involving a humoral effect upon the renal tubular transport of sodium. Studies now in progress are designed to evaluate directly the urinary excretion of a salt losing hormone in patients with primary aldosteronism and in normal subjects given aldosterone. Preliminary data suggest that post infusion urine from subjects receiving aldosterone results in a significant natriuresis when injected into normal rats. (Author)

AD-433 784 Div. 16
OTS price $3.60

Hudson Inst., Harmon-on-Hudson, N. Y.
SPECIAL ASPECTS OF ENVIRONMENT RESULTING FROM VARIOUS KINDS OF NUCLEAR WARS. PART II, APPENDIX 1-2. HISTORICAL EXAMPLES OF ECOLOGICAL DISASTER (II),
by Jean M. Ingersoll. 8 Jan 64, 38p. Rept. no. 303RR A1 2
Contract OCD OS62 218, Task 3511A
Unclassified report

Descriptors: (*Gastropoda, Ecology), (*Biology, Control systems), Disasters, Rabbits, Agriculture, Damage control, Reproduction (Physiology), Economics, Public health, Pest control, Effectiveness.

The giant African snail (A. fulica) and the European rabbit (Oryctolagus cuniculus) are life forms that have been introduced by man to regions outside their native habitats, where, unchecked by natural controls obtaining in their original environment, they proliferated and spread with disastrous effect to ecological balance in the invaded areas. In these two historic instances the catastrophe is measured chiefly as economic loss manifested in two ways: directly, in the destruction of crops on which humans depend for food or income; indirectly, by the creation of eroded lands unsuitable for pasturage or tillage and costly to restore to fertility, and in the cost of attempts to control the pest. These episodes furnish illustrations of some of the grim economic problems which can arise from an altered ecological balance, in these cases directly attributable to man's impact on the biological environment. (Author)

AD-433 804 Div. 16
OTS price $3.60

Naval Radiological Defense Lab., San Francisco, Calif.
IONIC RELATIONSHIPS OF THE BIOELECTROGENIC MECHANISM IN ISOLATED RAT STOMACH,
by J. T. Cummins and B. E. Vaughan. 10 Feb 64, 37p.
NRDL TR716 Unclassified report

Descriptors: (*Electric potential, Stomach), (*Stomach, Electric potential), (*Membranes (Biology), Transport properties), Metabolism, Rats, Tissues (Biology), Ions, Antimetabolites, Sodium, Physiology.

The potential as measured in vitro across rat stomach was examined by substitution, inhibition and flux studies. The effect of choline substitution for sodium on the potential was shown to be immediate, and to act on the mucosal influx, changing it from 1.4 to 0.2 micro eg of sodium/hr. Anoxic condition affected mucosal outflux only. The transmembrane potential is linearly dependent on mucosal sodium concentration to 55 mMolar, where the system apparently becomes saturated. Replacement of chloride by sulfate raises the potential. A potassium requirement could be demonstrated by the elimination of chloride, and a calcium deficiency was noted only in the presence of high concentrations of EDTA. (Author)

AD-433 848 Div. 16, 28
OTS price $2.60

California U., Berkeley.
NON-GENETIC CONTROL IN BIOLOGICAL SYSTEMS,
by H. J. Bremermann. July 63, 26p.
Contracts Nonr222 85, Nonr3656 08
Unclassified report

Descriptors: (*Genetics, Learning), (*Biology, Control systems), Behavior, Group dynamics, Speech, Communication systems, Personality, Emotions, Verbal behavior.

AD-433 855 Div. 16
OTS price $6.60

California Univ., Berkeley.
EXPERIMENTS WITH PATTERNS OF EVOLUTION,
by H. J. Bremermann and S. Salaff. Nov 63, 68p.
Contracts Nonr222 85, Nonr3656 08
Unclassified report

Descriptors: (*Linear systems, Biology), (*Genetics, Mathematical analysis), Linear programming, Mutations, Probability.

AD-433 866 Div. 16
OTS price $1.10

California U., San Francisco Medical Center.
ATTRACTIVENESS AND REPELLENCY OF MAN TO MOSQUITO BITES.
Annual progress rept., 1 July 63-15 Feb 64,
by Howard I. Maibach. 3 Mar 64, 9p.
Contract DA49 193md2466
Unclassified report

Descriptors: (*Culicadae, Bites & stings), (*Bites & stings, Culcicidae), Perspiration, Biochemistry, Insects.

In the first 8 months of investigating the attractiveness of humans to mosquitoes it was demonstrated that under ordinary working conditions there is little variability in the biting avidity of the female Aedes aegypti mosquito. In addition, it was shown that when handled carefully mosquitoes will bite at any time during the day with little variation from 4 days of age. Human volunteers were exposed to small numbers of Aedes aegypti mosquitoes placed in biting cages in an effort to find subjects who are less attractive or completely unattractive than others, but without a clue at this time as to why this is so. (Author)

AD-433 870 Div. 16
OTS price $1.60

Maryland U., College Park.
CURRENT REFERENCES IN MEDICAL ENTOMOLOGY FROM RUSSIAN, CENTRAL AND EASTERN EUROPEAN, AND CHINESE LITERATURE. VOLUME III, NO. 4,
by George Anastos. 1964, 14p.
Contract DA49 193md2238
Unclassified report

Descriptors: (*Bibliographies, Insects), (*Insects, Bibliographies), Ticks, Mites, Diseases, Disease vectors, Epidemiology, Viruses, Diptera, Lice, Parasites, Spirochaetaceae, Rickettsia, Immunology.

AD-433 886 Div. 16
OTS price $2.60

Naval Radiological Defense Lab., San Francisco, Calif.
CARCINOGENESIS BY FAST NEUTRONS RELATIVE TO X RAYS IN MICE: EFFECT OF UNINEPHRECTOMY AND OF CC14,
by L. J. Cole and P. C. Nowell. 15 Jan 64, 24p.
Task MR005 08 5200
NRDL TR713 Unclassified report

Descriptors: (*Radiation effects, Neoplasms), (*Neoplasms, Radiation effects), Mice, Neutrons, Kidneys, Surgery, Liver, X-rays.

This investigation is an attempt to provide further insights into the potential long-term carcinogenic hazards of radiation, and into the mechanisms of carcinogenesis. Young adult LAF1 mice were exposed to a single high sublethal dose of fission spectrum neutrons. They were subjected to unilateral nephrectomy, carried out

1 day before neutron irradiation, or a single CC1 injection 1 day befor neutrons or 1 month after neutrons. These and the control groups were sacrificed 12 - 16 months postirradiation. The data show a striking enhancement of liver tumor incidence (75%) in the neutron-irradiated mice receiving CC1 one month after irradiation, and an even greater incidence (92%) when the CC1 was administered one day prior to irradiation. By contrast, liver tumors appeared in 14% of mice receiving neutron irradiation only and in 2.4% of mice exposed to a single dose (500 rad) of 200 kvp X rays. (Author)

AD-433 918 Div. 16,30
OTS price $1.60

California Univ., Berkeley.
THE PRINCIPLE OF GENETIC COST,
by H. J. Bremermann. July 63, 15p.
Contracts Nonr222 85, Nonr3656 08
Unclassified report

Descriptors: (*Biology, Genetics), (*Genetics, Communication theory), Behavior, Stimulation, Mathematical logic, Cybernetics, Bionics.

AD-433 980 Div. 16
OTS price $1.60

Research and Technology Div, Air Force Systems Command, Edwards, Calif.
HEMATOLOGICAL CHANGES IN BEAGLES AFTER IRRADIATION BY NEUTRONS, X-RAY, AND RADIONUCLIDES,
by Jelle de Boer and Ronald E. Engel. Nov 63, 19p.
Proj. 7801, Task 780106
RTD TDR63 3012 Unclassified report

Descriptors: (*Radiation effects, Hematology), (*Hematology, Radiation effects), Neutrons, X-rays, Dogs, Radioactive isotopes, Distribution, Blood cells, Leukocytes, Blood platelets.

Three groups of five beagles were exposed to 400 rads of fission spectrum neutrons, 400 r 250 KVP X rays or 10 millicuries of a radionuclide mixture to determine the extent of radiation insult for each dose. The hematological response observed in each irradiation group was very similar, but differed in time of onset. (Author)

AD-434 068 Div. 16
OTS price $1.10

Colorado U. Medical Center, Denver.
SAFETY AND UTILITY OF I.V. FAT EMULSION FOR HUMAN INTRAVENOUS ADMINISTRATION.
Annual progress rept., 1 July 63-30 Mar 64,
by John F. Mueller. 30 Mar 64, 6p.
Contract DA49 193md2467
Unclassified report

Descriptors: (*Lipids, Metabolism), Injection (Medicine), Medical research, Physiology, Body temperature, Hematology.

The initial clinical experiences of our group with a European fat emulsion called Intralipid is reported. This emulsion is composed of soy bean oil, egg lecithin and glycerol. One hundred and thirty-four bottles, containing 500 cc of a 20% fat emulsion, were administered intravenously to 110 patients afflicted with a variety of diseases, mainly cancer. The overall incidence of a febrile reaction was 13.5%, characterized by being delayed for some 2-6 hours after the end of the infusion, often accompanied by shaking chills, nausea, and vomiting. Six different production lots were tested which showed great variability, one from the other, in their reactivity. Six subjects received short term daily infusions of either 4 or 5 days duration. Hematologic and liver function studies failed to show changes during this relatively short period of consecutive infusions. Clearing studies failed to show correlation between febrile response and rapidity with which clearing of the emulsion occurred. It is concluded that Intralipid is not a safe or suitable product for routine clinical use. (Author)

AD-434 079 Div. 16
OTS price $.75

California U., Los Angeles.
EFFECT OF COLD EXPOSURE ON THE ACTION OF MORPHINE IN RATS AND MICE,
by E. L. Way and H. W. Elliott. Nov 63, 24p..
Contract AF41 657 413, Proj. 8241 02
AAL TDR62 50 Unclassified report

Descriptors: (*Morphine, Laboratory animals), (*Exposure, Laboratory animals), Rats, Mice, Adaptation (Physiology), Sensitivity, Distribution, Toxicity, Measurement.

Data are presented showing that cold adaptation diminishes the depressant effects of morphine on respiratory minute volume, oxygen consumption and analgesia on the one hand, but enhances the toxicity of morphine on the other. Attempts to account for the difference in sensitivity between cold adapted and nonadapted animals by measuring the conjugation, excretion, and distribution of morphine in vivo, and by determining its effect on the respiration of KC1-stimulated brain slices in vitro were unsuccessful. (Author)

AD-434 080 Div. 16
OTS price $.50

Utah U. Coll. Medicine, Salt Lake City.
THE EFFECT OF ACUTE EXPOSURE TO 2 DEGREES C ON HOST RESISTANCE TO EHRLICH ASCITES TUMOR,
by S. Marcus, F. Miya and L. J. Phelps. Sep 63, 5p.
Contract AF41 657 311, Proj. 8241, Task 824101
AAL TDR63 10 Unclassified report

Descriptors: (*Low-temperature research, Physiology), (*Immunity, Neoplasms), Acclimatisation, Cells (Biology), Survival, Mice, Metabolism, Stress (Physiology).

Adult albino mice were challenged intraperitoneally and subcutaneously with Ehrlich ascites tumor cells. The challenged animals were then transferred to 2 degrees C . The cold exposed animals had higher mortality ratios for any given time period compared to 21 degrees C controls, although the final mortality ratios were the same. Possible explanations of the results are given in the discussion. (Author)

AD-434 082 Div. 16
OTS price $.50

Utah U., Coll. of Medicine, Salt Lake City.
THE EFFECT OF ZYMOSAN AND ENDOTOXIN TREATMENT ON EXPERIMENTAL COXSACKIE B VIRUS INFECTION,
by S. Marcus, F Miya and L. J. Phelps. Sep 63, 9p.
Contract AF41 657 311, Proj. 8241, Task 824101
AAL TDR63 11 Unclassified report

Descriptors: (*Acclimatization, Mice), (*Viruses, Infections), Exposure, Temperature, Toxins & antitoxins, Determination, Diseases, Effectiveness.

Cold acclimatized and nonacclimatized adult albino mice were given varying doses of zymosan or endotoxin subcutaneously 48 hours prior to challenge with 20 X 10 to the 4th power plaque forming units of Coxsackie B-1 virus intraperitoneally. Neither agent was effective in increasing host resistance and, in some instances, appeared to enhance the disease process. (Author)

AD-434 090 Div. 16
OTS price $1.10

Civil Aeromedical Research Inst., Oklahoma City, Okla.
CENTRAL NERVOUS SYSTEM EFFECTS OF CHRONIC EXPOSURE TO ORGANOPHOSPHATE INSECTICIDES,
by J. Robert Dille and Paul W. Smith. Oct 63, 9p.
CARI 63 24 Unclassified report

Descriptors: (*Insecticides, Nervous system), (*Nervous system, Insecticides), Toxicity, Pilots, Electroencephalography, Enzymes, Inhibition, Organic phosphorus compounds.

Two cases are reported in which persistent CNS changes were noted in aerial applicator pilots after chronic exposure to organophosphate insecticides. The symptomatology, the basis for these symptoms and EEG changes, and their reversibility are discussed. (Author)

AD-434 114 Div. 16
OTS price $.50

Utah Univ., Salt Lake City, Coll. of Medicine.
EFFECT OF ACCLIMATIZATION TO 2 C ON HOST SUSCEPTIBILITY TO KLEBSIELLA PNEUMONIAE CHALLENGE,
by S. Marcus, F. Miya and L. J. Phelps. Sep 63, 11p.
Contract AF41 657 311, Proj. 8241, Task 824101
AAL TDR63 9 Unclassified report

Descriptors: (*Klebsiella, Mice), Temperature, Survival, Exposure, Immunity, Microorganisms.

Adult albino mice were exposed to 2 C in groups for varying time periods prior to challenge intraperitoneally with 1 LD50 of Klebsiella pneumoniae. Animals exposed to the low temperature for up to five days prior to challenge showed no significant differences in mortality from the controls. Statistically significant survival ratios were obtained if the mice were exposed to cold for more than five days prior to challenge. No deaths were observed in comparable specifically immunized groups of animals. (Author)

AD-434 115 Div. 16
OTS price $1.10

Northwestern Technological Inst., Evanston, Ill.
COMBUSTION OF HUMAN WASTE AND PRODUCT RECOVERY,
by J. E. Quon, W. O. Pipes and J. A. Logan.
Oct 63, 10p.
Contract AF41 657 383, Proj. 8246, Task 8246 1
AAL TN62 16 Unclassified report

Descriptors: (*Wastes (Sanitary engineering), Combustion), Recovery, Kinetic theory, Algae, Carbon, Oxidation, Temperature.

AD-434 116 Div. 16
OTS price $1.60

Illinois Univ., Urbana.
CARDIOVASCULAR EFFECTS OF REFEEDING STRESS FOLLOWING STARVATION. XII. CONTINUATION OF LONG- TERM STARVATION AND REFEEDING EPISODES, FINAL EPISODES AND POST MORTEM RESULTS,
by G. S. Smith, B. Connor Johnson and R. L. Huston. Oct 63, 17p.
Contract AF41 657 359, Proj. 8238, Task 823803
AAL TN62 6 Unclassified report

Descriptors: (*Cardiovascular system, Starvation), (*Starvation, Cardiovascular system), (*Stress (Physiology), Starvation), Swine, Diet, Glucose, Heart, Respiration, Blood pressure, Consumption.

AD-434 219 Div. 16
OTS price $3.60

Naval Radiological Defense Lab., San Francisco, Calif.
A PERSISTENT BONE GROWTH DEFICIT IN THE X-IRRADIATED RAT,
by R. D. Phillips and D. J. Kimeldorf. 10 Feb 64, 37p.
NRDL TR721, NAVMED MR005 08 5201
Unclassified report

Descriptors: (*Bone, Growth), (*Radiation effects, Bone), Rats, Inhibition, Determination, X-rays, Life expectancy.

A critical assessment of the roentgenographic technique was made for a quantitative determination of bone and tail length in the rat. The method was found to be very reliable if error sources were controlled and minimized. The early and long term effects of x-irradiation on skeletal growth were investigated with respect to the age at exposure. Rats exposed at a juvenile age (37 days) to a sub-lethal dose (430 rads) exhibited a retardation in femur, tibia and tail growth within 14 days after exposure. The maximum deficit was attained within 30 days after exposure and remained approximately constant for the next 300 days. Femur and tibia length of animals which were exposed to x-rays as young adults (101 days of age) did not differ from those of controls for the first 2 months after exposure. However, there was a deficit in femur and tibia length in these animals at the end of life span. The magnitude of the bone length reduction at the end of life span was dose dependent. (Author)

AD-434 278 Div. 16, 32
OTS price $9.10

Fordham Univ., New York.
SELECTED ABSTRACTS FROM SOVIET BIOMEDICAL JOURNALS. NO. 3, SERIES 2,
by Robert Pollitzer. Nov 63, 108p.
Contract DA18 108 405CML867A
Unclassified report

Translation from Russion Literature.

Descriptors: (*Abstracts, Medicines), (*Pasteurella, Abstracts), Reviews, Parasites, Mammals, Ticks, Disease vectors, Diseases, Pathology, Encephalitis virus, Lice, Insects.

AD-434 268 Div. 16
OTS price $1.10

Peter Bent Brigham Hospital, Boston, Mass.
BIONOMICS OF THE STAPHYLOCOCCUS IN THE NASAL CARRIER.

Annual progress rept., 1 July 63-1 Apr 64,
by Carl W. Walter and Ruth B. Kundsin. 1 Apr 64, 6p.
Contract DA49 193md2455
Unclassified report

Descriptors: (*Staphylococcus, Disease vectors), (*Disease vectors, Medical personnel), Ecology, Throat, Diseases, Hazards, Contamination, Bacteriophages.

AD-434 298 Div. 16
OTS price $7.60

Army Biological Labs., Frederick, Md.
SELECTED ARTICLES FROM ZHURNAL MIKROBIOLOGII. EPIDEMIOLOGII I IMMUNOBIOLOGII VOL 40, NO. 7, 1963.
Sep 63, 71p.
ABL T901 909 Unclassified report

Descriptors: (*Immunity, Medical research), (*Vaccines, Viruses), Rickettsia, Toxins & antitoxins, Tissue extracts, Laboratory animals, Immunology, Infections, Lymphatic system, Reports.

AD-434 424 Div. 16
OTS price $1.10

School of Aerospace Medicine, Brooks Air Force Base, Tex.
ENDOCRINE AND METABOLIC EFFECTS OF SHORT-DURATION HYPEROXIA,
by Henry B. Hale, Edgar W. Williams, John E. Anderson and James P. Ellis, Jr. Feb 64, 9p.
Task 775801
SAM TDR64 6 Unclassified report

Descriptors: (*Endocrine glands, Metabolism), (*Physiology, Endocrine glands), Pressure breathing, Adrenal cortex, Adrenal glands, Epinephrine, Urinary system, Excretion, Stress (Physiology).

This investigation was concerned with the effects of breathing 100% oxygen (by mask) at 1 atmosphere ambient pressure for 4 hours on sympathoadrenal, adrenocortical, and metabolic functions in healthy human subjects. Control determinations were made on the same subjects on a separate occasion by having the subjects breathe room air (by mask). Sympathoadrenal activity was appraised by means of urinary epinephrine and norepinephrine determinations; adrenocortical activity was appraised by means of plasma cortisol and urinary 17-hydroxycorticosteroid determinations; and metabolic appraisal was made by means of urinary creatinine, urea, uric acid, phosphate, potassium, and sodium. Evidence of hyperoxia-induced adrenocortical and sympathoadrenal depression was found -- plasma cortisol concentration, as well as catecholamine excretion, falling below the control levels. Urine volume also was relatively low, as were urinary sodium and phosphate values. Mask discomfort was shown to be an obscuring factor, since it acted oppositely to hyperoxia in many respects. (Author)

AD-434 425 Div. 16
OTS price $1.10

School of Aerospace Medicine, Brooks Air Force Base, Tex.
CONSTRUCTION AND USE OF A SIMPLE, SELF-GUIDING CATHETER FOR RIGHT HEART AND PULMONARY ARTERY IMPLANTATION,
by William P. Fife. Feb 64, 7p.
Task 775801
SAM TDR64 10 Unclassified report

Descriptors: (*Cannulation, Cardiovascular system), Surgery, Heart, Arteries, Surgical supplies, Blood pressure, Medical research.

A catheter was developed which can be easily and rapidly implanted in the right heart or pulmonary artery. Fabricated from Tygon tubing, the catheter contain a thin section located 2 cm. from the distal end. This results in a tip which follows the bloodstream without special manipulation. During implantation, its position is monitored by the use of a pressure transducer, thus eliminating the need for fluoroscopy. Since the catheter is self-guiding, it may be implanted with ease from such distal locations as the femoral vein. It can be used to inject substances directly into the heart or pulmonary artery, or to withdraw blood samples. It also can be used to make pressure recordings of high quality from these areas. (Author)

AD-434 426 Div. 16
OTS price $1.60

School of Aerospace Medicine, Brooks Air Force Base, Tex.
DETERMINATION OF THE SOLUBILITY OF NITROGEN IN WATER AND EXTRACTED HUMAN FAT,
by Kenneth G. Ikels. Feb 64, 13p.
Task 775801
SAM B TDR64 1 Unclassified report

Descriptors: (*Nitrogen, Solubility), Measurement, Absorption (Physical), Fats, Water, Chromatographic analysis, Instrumentation, Analysis of variance.

AD-434 459 Div. 16
OTS price $11.50

Lever Brothers Co., Edgewater, N.J.
BASIC STUDIES IN PERCUTANEOUS ABSORPTION. Semi-annual rept. no. 6,
by Leonard J. Vinson, Walter R. Koehler, Thomas Masurat and Edward J. Singer. Dec 63, 158p.
Contract DA18 108CML6573
Unclassified report

Descriptors: (*Skin, Permeability), (*Absorption (Biological), Skin), Vapors, Penetration, Alcohols, Amines, Silicic acids, Diffusion, Membranes (Biology), Laboratory animals, Electrodialysis, Electrical conductance, Fatty acids, Linolenic acid.

Apparatus and techniques have been developed to measure vapor diffusion of chemicals through separated epidermis. The penetration of alcohols and amines has been investigated by this method. Another new technique developed for investigating the penetration of simple agents through skin is that of electrodialysis, which has permitted the study of ionic species which do not normally penetrate skin. A new technique for use in gas chromatographic analysis of fatty acids has also been developed. (Author)

AD-434 684 Div. 16
OTS price $1.75

Boeing Co., Seattle, Wash.
EFFECTS OF SIMULATED AEROSPACE SYSTEM ENVIRONMENTS ON THE GROWTH OF SELECTED ANGIOSPERMS.
Dec 63, 66p.
Contract AF33 657 8341, Proj. 7164, Task 716405
AMRL TDR63 131 Unclassified report

Report on Biomedical Criteria for Aerospace Flight.

Descriptors: (*Plants (Botany), Growth), (*Sewage, Growth substances), Adaptation (Physiology), Closed ecological systems, Photosynthesis, Light, Regeneration, Fluorescence, Colors, Experimental data, Vegetables, Tables, Chlorophyll, Nutrition, Measurement, Photographs, Acceptability.

A series of detailed studies were performed to evaluate the growth of selected Angiosperms on substrates composed of the effluent from waste disposal processes and to measure growth and photosynthesis under a variety of atmospheres and lighting conditions. The plants used most extensively were Brassica chinensis (Chinese cabbage), Amaranthus gangeticus (Tampala), and Chicorium endiva (endive). Some preliminary experimentation was also performed using Beta vulgaris cicla (Swiss chard) and two other members of the genus Brassica, kale and collards. The results indicate that growth on effluents of biological waste disposal processes will be satisfactory only upon supplementation, further treatment, or adaptation to the effluent. Growth under narrow-band fluorescent lamps, or combinations of several colored lights, in no case approached that observed under light sources that were specifically designed to promote plant growth. The results indicate that major advances must be made in the employment of artificial light if economical use is to be made of plants in closed regenerating systems. (Author)

AD-434 713 Div. 16
OTS price $4.60

Magna Corp., Anaheim, Calif.
BIOCHEMICAL FUEL CELLS.
Quarterly progress rept. no. 6, 1 Oct-31 Dec 63, by W. R. Momyer and H. P. Silverman. 31 Dec 63, 42p.
Contract DA36 039sc90866, Task 1G6 22001A053 04
Unclassified report

Descriptors: (*Biochemistry, Fuel cells), (*Fuel cells, Biochemistry), Electrochemistry, Escherichia, Pyruvates, Glucose, Electric currents.

The electro-oxidation of formic acid was investigated under conditions compatible with, but independent of, biological systems. Current densities near 10mA/sq cm at polarizations less than 0.25 volt were consistently obtained with formic acid under these experimental conditions. The effects of temperature, electrode catalyst, pH, and fuel concentration on the electrochemical performance of this electrode are reported. The electrochemical behavior of the E. coli-glucose and the E. coli-pyruvate systems (formic acid bioelectrodes) were investigated using dispersed suspensions of the bacteria. Current densities of 5 mA/sq cm at polarizations near 0.25 volt were obtained with these bioelectrochemical systems. Thus, the rate of biological generation of formic acid is presently limiting the current output in both of these systems. (Author)

AD-434 726 Div. 16
OTS price $5.60

New York Eye and Ear Infirmary, N. Y.
EFFECTS OF THERMAL ENERGY ON RETINAL FUNCTION, by Jerry Hart Jacobson, Harold W. Najac and Blossom Cooper. Dec 63, 56p.
Contract AF33 616 7685, Proj. 6301, Task 630103
Unclassified report

Descriptors: (*Thermal radiation, Eye), (*Retina, Burns), Threshold (Physiology), Light pulses, Rabbits, Pathology, Thermocouples, Autoradiography, Spectra (Visible & ultraviolet).

The retina of pigmented grey chinchilla rabbits were exposed to the visible part of the spectrum to determine the retinal burn threshold. The study included the measurement of temperature rise at the center of the burn and various distances from it, evaluation of repeated subthreshold exposures, autoradiographic and histochemical studies of threshold and subthreshold lesions. (Author)

AD-434 729 Div. 16
OTS price $4.60

Ohio State U. Research Foundation, Columbus.
VISUAL RECOVERY FROM BRIEF EXPOSURES TO VERY HIGH LUMINANCE LEVELS.
Interim rept. no. 1,
by Norma D. Miller and Glenn A. Fry. Dec 63, 50p.
Contract AF33 657 9229, Task 630103
Unclassified report

Descriptors: (*Vision, Illumination), Visual acuity, Recovery, Light, Display panels, Reaction (Psychology), Exposure, Optical equipment, Measurement, Adaptation (Physiology), Intensity.

The design and calibration of the apparatus for delivering brief, high intensity flashes from a xenon-filled flash tube are described. A maximum field luminance of 4.6 x 10 to the 5th power lamberts was provided by the flash tube seen by Maxwellian view. A rotating mirror was synchronized with the flash tube discharge to produce exposure durations from 42 Mu sec to 1.4 msec. Field sizes could be varied from a point source to 10 degrees, and an adapting field optical system allowed the subject to be preadapted to various luminance levels before the flash was received. The criterion measure for recovery times following the flash was the correct identification of Sloan-Snellen test letters. Five different letter sizes were provided subtending visual angles from 41.9 to 10.2 minutes of arc. Some data are reported for five exposure durations of the flash and for five field sizes for the 20.3 minutes of arc tests letter at a luminance of 0.066 mL. (Author)

AD-434 869 Div. 16
OTS price $2.60

Trinity Coll., Dublin (Eire).
TO INVESTIGATE GENETIC INSTABILITY IN BACTERIA, PARTICULARLY WITH RESPECT TO THE PRESENCE OF CONTROLLING EPISOMES.
Final technical rept., 1 Jan-31 Dec 63.
Dec 63, 24p.
Contract DA91 591EUC2756
Unclassified report

Descriptors: (*Bacteria, Genetics), (*Genetics, Bacteria), Stability, Salmonella, Growth, Synthesis (Chemistry), Amino acids, Metabolism.

AD-434 870 Div. 16
OTS price $1.10

School of Aerospace Medicine, Brooks Air Force Base, Tex.
TRANSIENT CHANGES IN ARTERIAL LACTIC ACID OF DOGS AT 21,000 FEET,
by Stephen M. Cain and James E. Dunn II. Mar 64, 10p.
Task 775801
SAM B TDR64 2 Unclassified report

Descriptors: (*Lactic acid, Blood circulation), (*Blood chemistry, High altitude), (*High altitude, Physiology), Pyruvic acid, Bicarbonates, Oxygen consumption, Hypoxia, Dogs, Aviation medicine.

After a 3-hour control period at ground level, unanesthetized dogs were exposed for 8 hours to 21,000 feet simulated altitude (Pb=335 mm. Hg). Arterial blood samples were drawn frequently from a Teflon T-cannula surgically placed in a cartoid artery 1 or 2 days prior to the experiment. Lactic and pyruvic acid concentrations, PcO2, PO2, and pH were measured. At altitude, the average arterial PO2 was 32 mm. Hg. PcO2 was 24 mm. Hg and pH was 7.50 mm. Hg. All control values fell in normal ranges. Although the magnitude of changes differed among animals, arterial lactic acid reached a peak value within the first 2 hours at altitude, gradually declining thereafter, and in most animals it closely approached the control value during the eighth hour at altitude. Excess lactate changed in a similar manner (with no concomitant relief of arterial hypoxia and hypocapnia). The decline in lactic acid remains unexplained. (Author)

AD-434 871 Div. 16
OTS price $1.10

School of Aerospace Medicine, Brooks Air Force Base, Tex.
HORIZONTAL TOOTH MOBILITY IN CAREFULLY SCREENED SUBJECTS,
by Kenneth D. Rudd, Timothy J. O'Leary and Arthur J. Stumpf, Jr. Feb 64, 10p.
Proj. 7040
SAM B TDR64 12 Unclassified report

Descriptors: (*Teeth, Motion), (*Dentistry, Medical research), Instrumentation, Measurement.

Sixty-one healthy young males between 17 and 24 years of age were used to estimate the normal range of horizontal tooth mobility. These subjects had been carefully examined to insure that they were in good gingival and periodontal health with no easily detectable oral habits Subjects with more than a minimal amount of malocclusion were also eliminated from the study It was found that the range of horizontal tooth mobility was rather wide. There were distinct differences in mean mobility values between teeth of the same type. (Author)

AD-434 920 Div. 16
OTS price $1.10

Army Biological Labs., Frederick, Md.
DIFFERENTIAL MOLYBDENUM MEDIUM FOR PLAGUE AND PSEUDOTUBERCULOSIS BACTERIA,
by N. Ye. Gubina, T. T. Voronia and N. P. Pobivantseva, Trans. by Charles T. Ostertag, Jr. Aug 63, 7p.
ABL T867 Unclassified report

Trans. from Jnl. of Microbiology, Epidemiology and Immunobiology, No. 10, pp. 12-15, 1962.

Descriptors: (*Pasteurella, Diseases), (*Diseases, Pasteurella), Tuberculin, Diagnosis, Identification, Detection, Culture media, Growth.

AD-434 921 Div. 16
OTS price $1.10

Army Biological Labs., Frederick, Md.
THE FATE OF PLAGUE BACTERIOPHAGE IN THE ORGANISM OF HEALTHY AND PLAGUE INFECTED GREAT GERBILS AND THE POSSIBLE ROUTES OF ITS TRANSMISSION IN EXPERIMENTAL CONDITIONS,
by I. L. Martinevskiy, M. A. Shashayev, N. F. Tarakanov and A. T. Shapovalov, Trans. by Charles T. Ostertag, Jr. Sep 63, 7p.
ABL T 911 Unclassified report

Trans. from Jnl. of Microbiology, Epidemiology, and Immunobiology (Soviet Jnl., no. 5, pp. 31-34, 1963.

Descriptors: (*Diseases, Pasteurella), (*Pasteurella, Diseases), Infections, Bacteriophage, Epidemiology, Microorganism, Rodents.

AD-434 937 Div. 16
OTS price $1.60

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
ACTION OF GIBBERELLIC ACID ON PROTOCOCCALES,
by V. V. Pinevich, N. N. Verzilin and V. E. Vailea. 12 Nov 63, 13p.
FTD MT63 49 Unclassified report

Trans. from Nauchnye Doklady Vysshey Shkoly, Biologicheskiye Nauki, Nr. 3, pp. 151-154, 1961.

Descriptors: (*Algae, Growth substances), (*Growth substances, Algae), Carboxylic acids, Polycyclic compounds, O-heterocyclic compounds.

AD-434 948 Div. 16
OTS price $1.60

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
OVERLOADING AND WAY OF INCREASE OF ENDURANCE OF ORGANISM,
by V. Stepantsov and G. Khlebnikov. 17 Apr 63, 13p.
FTD MT63 20 Unclassified report

Trans. from Aviatsiya I Kosmonautika, No. 1, pp. 44-48, 1963.

Descriptors: (*Stress (Physiology), Astronauts), (*Astronauts, Stress (Physiology)), Acceleration tolerance, Physiology, Blood circulation, Training, Physical fitness.

AD-434 985 Div. 16
OTS price $2.60

Tennessee U., Knoxville.
TREATMENT OF VESICANT AND THERMAL BURNS.
Annual rept., 31 Dec 62-1 Jan 64,
by Roger T. Sherman. 1 Feb 64, 25p.
Contract DA18 108cml7113
Unclassified report

Descriptors: (*Burns, Therapy), (*Medical research, Burns), Healing, Body fluids, Skin, Vaporization, Gravimetric analysis, Military medicine, Clay minerals.

AD-435 030 Div. 16
OTS price $6.60

Tracor Inc., Austin, Tex.
THE EVALUATION OF THE HAVERFORD-BIONIC INSTRUMENTS OBSTACLE DETECTOR.
Summary rept.
by Philip Worchel, Donn Byrne and Robert Young.
27 Nov 63, 1v.
Contract V1005P 9639
Unclassified report

Descriptors: (*Detectors, Effectiveness), Analysis, Electronic equipment, Blindness, Performance tests, Learning, Training, Sensory mechanisms.

This final report is presented in four sections: (1) the selection of the totally blind subjects, (2) the procedure employed in training the subjects to use the Obstacle Detector (O/D) and in evaluating the effectiveness of the instrument, (3) the analyses of the performance of the subjects with and without the O/D and their subjective reactions to the instrument, and (4) the general conclusions concerning the usefulness of the instrument. (Author)

AD-435 045 Div. 16
OTS price $1.10

Brooke Army Medical Center, Fort Sam Houston, Tex.
ECOLOGY AND CONTROL OF DIESEASE VECTORS AND RESERVOIRS.
Progress rept. 1 July 63-30 June 64,
by Alvin A. Therrien, Vernon J. Tipton, William G. Pearson, John F. Reinert and David G. Young.
30 June 64, 9p.
Proj. 3A025601A806

Unclassified report

Descriptors: (*Siphonaptera, Collecting methods), Parasites, Rodents, Reproductive system, Design, Infections, Trypanosoma, Insect control.

Over 200 small rodents and several hundred fleas have been collected at high elevations in the Chisos Mountains in Texas. Collections made at elevations in excess of 7,000 feet are represented by four genera of fleas. One (Hystricopsylla) represents the first record of this genus in Texas. Preliminary field test of a new trap for flying insects shows promising results for collecting adult mosquitoes. Trap is designed on the principle of the Shannon Dawn Trap, but collects insects automatically and alive. Deinocerites pseudes were collected for the first time in the United States. Biting collections indicate D. pseudes will readily feed on man. Host crabs have been associated with this species. A review of the literature indicates sixteen species of reduviid bugs were reported naturally infected and five experimentally infected with Trypanosoma cruzi in the United States. Fifteen natural reservoirs and twenty-eight experimental reservoirs were recorded. Naturally infected reservoirs of T. cruzi were found over a broader geographic range than naturally infected vectors. (Author)

17. METALLURGY

AD-433 492 Div. 17
OTS price $2.60

Aerospace Corp., Los Angeles, Calif.
GENERAL RESEARCH, CREEP OF NIOBIUM AT LOW TEMPERATURES,
by G. A. Stone and H. Conrad. 21 Feb 64, 25p.
Rept. no. ATN 64 9236 9
Unclassified report

Descriptors: (*Niobium, Creep), (*Creep, Niobium), Heat of activation, Stresses, Strain (Mechanics), Plasticity, Deformation, Low-temperature research, Temperature.

The activation energy, the activation volume, and the frequency factor for the plastic deformation of niobium at low temperatures were derived from creep tests. These values are in excellent agreement with those derived from constant strain rate tests, indicating an equivalence between the two types of testing. The present results support the idea that overcoming the Peierls-Nabarro stress is the rate-controlling mechanism during the plastic deformation of the BCC metals at low temperatures. Using the models of Seeger and of Dorn and Rajnak the kink energy in niobium is calculated to be 0.34 to 0.40 eV. (Author)

AD-433 573 Div. 17
OTS price $17.00

North American Aviation, Inc., Downey, Calif.
AEROSPACE CORROSION AND MOISTURE PROBLEMS: A REVIEW OF THE RESEARCH REPORTS,
by J. R. Linger. 20 Jan 64, 259p. Rept no. SID64 11
Unclassified report

Descriptors: (*Bibliographies, Corrosion), (*Corrosion, Bibliographies), Moisture, Corrosive gases, Corrosive liquids, Electrolytic cells, Aerospace craft.

AD-433 583 Div. 17
OTS price $1.10

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
CREEP OF STEEL OF VARIOUS ALLOYING DEGREES,
by M. P. Braun and B. B. Vinokur. 2 Mar 64, 6p.
FTD TT64 48 Unclassified report

Trans. from AN UKRRSR. Dopovidi, no. 9, pp. 1190-1193, 1963.

Descriptors: (*Steel, Creep), Silicon alloys, Manganese alloys, Chromium alloys, Nickel alloys, Tungsten alloys, Molybdenum alloys, Austenite, Carbides.

AD-433 658 Div. 17
OTS price $4.60

Naval Radiological Defense Lab., San Francisco, Calif.
SOMME GAMMA-RAY SHIELDING PROPERTIES OF FINITE STEEL SLABS,
by G. E. Langer and B. W. Shumway. 21 Jan 64, 46p.
Proj. SF011 05 11, Task 0501
Unclassified report

Descriptors: (*Steel, Gamma rays), (*Gamma rays, Shielding), Metal plates, Effectiveness, Thickness, Dose rate, Measurement, Radiation damage, Photons.

Somme gamma-ray shielding properties of plane steel slabs placed between a point source and a point detector were investigated. The dose buildup resulting from 8 by 9 ft slabs 0.25, 1.00, and 1.50 in. thick (0.36, 1.45, and 2.17 mean free paths) placed between a Cs(137) point source and a small hemisphereical ionization chamber was measured. The distance from the source to the detector was 16 ft. Each slab was placed at five selected points between the source and the detector in order to observe the variation in dose buildup with slab position. The dose buildup due solely to singly scattered photons was calculated both for the 8 by 9 ft slabs and for slabs of infinite extent. The measured values of dose buildup are compared with the calculations. (Author)

AD-433 722 Div. 17
OTS price $1.60

Army Materials Research Agency, Watertown, Mass.
ANISOTROPY OF TITANIUM SHEET IN UNIAXIAL TENSION,
by Frank R. Larson. Dec 63, 20p.
Proj. 1A024401A111
AMRA TR63 36 Unclassified report

Descriptors: (*Titanium alloys, Tensile properties), (*Tensile properties, Anisotropy), Symmetry (Crystallography), Rolling (Metallurgy), Sheets.

An investigation of the mechanical anisotropy of titanium sheet alloys was carried out. This experimental survey of the uniaxial tension anisotropic characteristics was executed on a wide variety of alpha, alpha-beta, and beta alloys of both recent and ancient vintage. It was clearly demonstrated that both the elastic and plastic properties were widely varying in anisotropy. Furthermore, it was found that there was a direct correlation between the elastic and plastic anisotropy. Although considerable variation of anisotropy existed for one alloy, there was a tendency for the all-alpha alloys to be highly resistant to thinning. It was found that increased amounts of beta stabilizing elements present in the alloy had a tendency to lower this resistance to thinning. (Author)

AD-433 754 Div. 17
OTS price $1.60

Honeywell Research, Center, Hopkins, Minn.
THE MECHANICAL AND MICROMECHANICAL PROPERTIES OF BORON.
Interim rept. no. I, 1 Jan-29 Feb 64,
by J. A. Sartell and C. H. Li. 16 Mar 64, 17p.
Rept. no. 64 255
Contract NOw64 0159f
Unclassified report

Descriptors: (*Boron, Manufacturing methods), (*Crystals, Mechanical properties), Laboratory furnaces, Material forming, Hot working, Sintering, Reduction (Chemistry), Boron compounds, Bromides, Castings, Metallography, Microstructural, Tensile properties, Fracture (Mechanics), Powder metallurgy, Rods.

Several methods of producing polycrystalline boron specimens were evaluated, and zone-sintering, hot pressing, and melting were selected for use in this project. Sawing, polishing, and etching techniques were developed for the preparation of boron for mechanical testing and for

microscopic examination. Cast boron was prepared and tested and was found to be extremely sensitive to surface condition. Fracture was found to be partly intergranular and partly transgranular. (Author)

AD-433 782 Div. 17
OTS price $2.25

Defense Metals Information Center, Columbus, Ohio.
PROPERTIES OF COATED REFRACTORY METALS,
by W. A. Gibeaut and E. S. Bartlett. 10 Jan 64, 98p. Rept. no. 195
Contract AF33 615 1121, Proj. 8975
Unclassified report

Rept. no. 195, suppl. to rept. no. 162, AD-271 384.

Descriptors: (*Refractory coatings, Refractory metals and alloys), (*Refractory metals and alloys, Refractory coatings), Niobium, Niobium alloys, Molybdenum, Molybdenum alloys, Tantalum, Tantalum alloys, Tungsten, Foils, Heat-resistant metals and alloys, Aluminum alloys, Tin alloys, Silicides, Aluminum coatings, Emissivity, Fatigue (Mechanics), Rupture, Oxidation, Life expectancy, Mechanical properties, Tensile properties.

This report summarizes the information generated since the middle of 1961 on the chemical, physical, and mechanical properties of refractory metals that are coated with oxidation-resistant coatings of advanced-experimental or commercial status. It is a supplement to DMIC Report 162, Coatings for the Protection of Refractory Metals from Oxidation, dated November 24, 1961. Recent data on specific silicide- and aluminide- type coatings for columbium, molybdenum, tantalum, and tungsten and their alloys reflect general advances in coating quality and performance, understanding of the behavior of coated systems, and more complete realization of the problems associated with the use of coated hardware. (Author)

AD-434 008 Div. 17
OTS price $6.60

British Welding Research Association.
INFLUENCE OF ALLOYING ELEMENTS ON THE CONTINUOUS COOLING TRANSFORMATION AND WELDABILITY OF BINARY AND TERNARY ALLOYS OF IRON.
Final technical rept. 1 Dec 62-28 Feb 63. May 63, 16p. Rept. nos. C59 12 63; B2 WSS46 63
Contract DA91 591EUC2250
Unclassified report

Descriptors: (*Iron alloys, Transformations), (*Welding, Microstructure), Hydrogen embrittlement, Steel, Cooling, Hardness, Austenite, Heat treatment, Pearlite, Martensite, Bainite, Fracture (Mechanics), Dilatometers, Metallography, Sulfur, Phosphorus, Carbon alloys, Silicon alloys, Manganese alloys, Aluminum alloys, Molybdenum alloys, Nickel alloys, Chromium alloys.

Dilatometric, metallographic and hardness studies were used in determining the continuous cooling transformation behaviour of a wide range of binary, ternary and quaternary alloys of iron. Welding tests were made on these alloys and a general correlation of heat affected zone cracking with hardness and microstructure in the heat affected zone has been obtained. The results can be used in establishing a rational approach to the problem of devising satisfactory welding procedures for different compositions. It is shown that alloys may be classified in five main groups, the approach to welding them depending on hardenability and microstructural type within each group. (Author)

AD-434 066 Div. 17
OTS price $2.60

Army Engineer Research and Development Labs., Fort Belvoir, Va.
TIME-TEMPERATURE PARAMETER FOR RUPTURE STRESSES IN NIMONIC 80A AND MONEL, USING MECHANICAL-CHEMICAL EQUATIONS OF STATE.
by S. Goldfein. 20 Jan 64, 23p.
Task 1D024401A11402
AERDL TR1766 TR
Unclassified report

Descriptors: (*Nickel alloys, Rupture), (*Rupture, Stresses), Chromium alloys, Copper alloys, Equations of state, Time, Temperature, Mathematical analysis, Integration, Experimental data.

The object of this investigation was to determine if a parameter derived rom a mechanical-chemical equation of state could be used to characterize rupture stresses of alloys previously reported not to have been amenable to analysis with good accuracy by other formulas. Stress-rupture data for Nimonic 80A and Monel were analyzed by making calculations on assumed values of a concentration parameter. A dataplotter was used to draw master rupture curves, and a complete set was obtained in decade intervals. It is concluded that a second-order form of the mechanical-chemical equation of state K = T(22.78 +log at/2) has been found capable of characterizing Nimonic 80A and Monel, two alloys previously reported not to have been analyzable by other parameters. (Author)

AD-434 098 Div. 17
OTS price $2.60

Aerospace Corp., Los Angeles, Calif.
THE EFFECT OF STRESS ON THE LUDERS BAND VELOCITY IN NIOBIUM,
by H. Conrad and G. A. Stone. 12 Nov 63, 19p.
Rept. no. ATN 64 9236 5
Contract AF04 695 269
Unclassified report

Descriptors: (*Niobium, Deformation), (*Stresses, Niobium), Strain (Mechanics), Metallic crystals, Creep, Time, Impurities.

A study was made of the effect of stress on the Luders band velocity at room temperature in niobium of two impurity levels. The results indicate that the velocity is uniquely dependent on the effective stress, being independent of specimen length, crosshead velocity, the number of fronts, and the long-range internal stress fields associated with the structure. The activation volume as a function of stress derived from the present tests is independent of impurity content and is in good accord with that derived previously for yielding and flow in niobium and thus supports that the thermally activated overcoming of the Peierls-Nabarro stress is the rate controlling mechanism. (Author)

AD-434 112 Div. 17
OTS price $8.10

Pitman-Dunn Inst. for Research, Army Frankford Arsenal, Philadelphia, Pa.
RESEARCH CONDUCTED ON SECRETARY OF ARMY RESEARCH AND STUDY FELLOWSHIP TRANSMISSION ELECTRON MICROSCOPY,
by Edwin R. Levin. Jan 64, 86p.
Proj. 599 01 044
PDIR R1706 Unclassified report

Descriptors: (*Electron microscopy, Metallurgy), (*Refractory metals and alloys, Crystal structure), Crystal lattice defects, Niobium, Tantalum, Heat treatment, Fatigue (Mechanics), Deformation.

A detailed study was made of prismatic dislocation loops in the bcc refractory metals Nb and Ta. It was found that appreciable densities of dislocation loops can be created in these metals by fatigue deformation. The kinetics of annealing of the loops was studied, and it was found that in both metals the loops anneal out with appreciable time rates at temperatures above 700 C. From the data, the activation energy for self-diffusion could be obtained, and values were derived for both Nb and Ta. (Author)

AD-434 207 Div. 17
OTS price $1.10

Materials Research Lab., Inc., Richton Park, Ill.
THE USE OF STRAIN SOFTENING TO IMPROVE THE PROPERTIES OF REFRACTORY METALS.
Quarterly progress rept. no. 1, 1 Dec 63-29 Feb 64,
by E. J. Ripling and S. Zager. 28 Feb 64, 8p.
Contract NOw64 0247c
Unclassified report

Descriptors: (*Refractory metals & alloys, Mechanical working), (*Molybdenum alloys, Strain (Mechanics)), Deflection, Cold working.

Effort was directed toward obtaining a better understanding of the mechanics of the MRL flexing machine, and toward improving the reliability and repeatability of experiments. The roller-flexer was stiffened; accuracy of the gap setting was improved; tensil loads during flexing were recorded as a function of travel; surface strains as measured by curvature and thickness strains were recorded after each pass; and, temperature control during specimen testing was improved. Molybdenum - 0.5 Ti Alloy (0.005 in. thick) was flexed at room temperature. Tensile loads were equalized insofar as possible for both directions of travel. Repeatability of test procedure is indicated, but the influence of this on properties of the flexed material has not been ascertained. (Author)

AD-434 212 Div. 17
OTS price $.50

Defense Metals Information Center, Columbus, Ohio.
A REVIEW OF SOME ELECTRON-MICROSCOPIC FRACTOGRAPHIC STUDIES OF ALUMINUM ALLOYS,
by W. R. Warke. 5 Feb 64, 12p. Memo. no. 186
Contract AF33 615 1121, Proj. 8975
Unclassified report

Descriptors: (*Fractography, Aluminum alloys), (*Aluminum alloys, Fractography), Fatigue (Mechanics), Fracture (Mechanics), Corrosion, Electron microscopy, Surfaces, Zinc alloys, Magnesium alloys.

This report is concerned with the fractography of aluminum alloys under cyclic loading conditions. The first section is a summary of a report which deals with the effect of constituent particles on fatigue crack propagation in 7178 aluminum alloy. The second section contains recent information on fatigue of aluminum alloys under corrosive conditions. (Author)

AD-434 214 Div. 17
OTS price $.75

Rock Island Arsenal Lab., Ill.
MINOR ALLOY ADDITIONS TO ALUMINUM ALLOY MELTS,
by R. B. Miclot. 26 Nov 63, 19p.
RIAL 63 2892 Unclassified report

Descriptors: (*Aluminum alloys, Additives), (*Impurities, Aluminum alloys), (*Castings, Aluminum alloys), Beryllium, Sodium, Melting, Heat treatment, Mechanical properties, Elasticity, Tensile properties, Rods, Tables, Casting alloys.

Results of tensile tests on beryllium and sodium treated aluminum alloys, with high iron impurity, are presented. The yield strength of 195-T6 alloy, 0.64% iron, is increased 30% by a 0.02% beryllium addition. Cast-to-size tensile bars from degassed and beryllium treated melts exhibit approximately 29,000 psi. yield strength, 43,000 psi. tensile strength, a nd 4% elongation. A small quantity of beryllium, (0.05% addition), slightly improves the tensile strength and elongation of 356-T6 alloy, 0.65% iron, but does not appreciably effect the yield strength. Gradual decline in yield strength and rise in elongation is observed with increase in beryllium additions to 40E alloy, 0.58% iron, in heat-treated conditions. Mechanical properties of aluminum-silicon alloys-356 and A356 - were not improved by sodium treatment preceded by beryllium additions to degassed melts. (Author)

AD-434 234 Div. 17
OTS price $2.60

Aluminum Co. of America, New Kensington, Pa.
INVESTIGATION OF THE MECHANISM OF STRESS CORROSION OF ALUMINUM ALLOYS.
Quarterly rept. no. 1, 6 Dec 63-29 Feb 64,
by G. C. English and William King. 1 Apr 64, 25p.
Contract NOw64 0170c
Unclassified report

Descriptors: (*Aluminum alloys, Corrosion), (*Corrosion, Stresses), Cathodic protection, Polarization, Sheets, Electric currents, Electric potential, Electrolytes, Sodium compounds, Chlorides, Test methods, Electrical conductance.

Methods have been developed to utilize the standard 1/8-inch diameter tensile bar and stressing fixture for conductivity studies to establish the cathodic protection criterion for both unstressed and stressed specimens. An anodic polarization technique that shows promise for evaluating the interaction between metallurgical structure and electrolyte has been developed. There are two important factors in the technique: (1) an anodic pretreatment to develop active, localized attack characteristic of the metallurgical structure and (2) a rapid scanning rate to evaluate this localized attack before it is stifled by film repair. (Author)

AD-434 247 Div. 17
OTS price $1.10

Aerojet-General Corp., Azusa, Calif.
THE INVESTIGATION OF STRESS CORROSION CRACKING OF HIGH STRENGTH STEELS.
Informal monthly progress rept. no. 13 for Feb 64,
by R. B. Setterlund. 27 Mar 64, 6p. Rept. no. L0414 02 6
Contract DA04 4950RD3069
Unclassified report

Descriptors: (*Steel, Fracture (Mechanics)), (*Stresses, Corrosion), Corrosive gases, Corrosive liquids, Mechanical properties, Environmental tests, Temperature.

AD-434 383 Div. 17
OTS price $2.25

American Brake Shoe Co., Mahwah, N. J.
DEVELOPMENT OF HIGH INTEGRITY CLOSE TOLERANCE HIGH STRENGTH AIRCRAFT QUALITY STEEL CASTINGS.
Rept. for May 61 - May 63.
by John B. Dabney and Hugo R. Larson. Mar 64, 97p.
Contract AF33 616 8004, Proj. 7381, Task 738102
ASD TDR63 708 Unclassified report

Report on Materials Application.

Descriptors: (*Castings, Steel), (*Steel, Mechanical properties), Tool steel, Ductility, Toughness, Bainite, Microstructure, Nickel alloys, Chromium alloys, Melting, Casting, Degassification, Heat treatment, Metallography, Metal plates, Chemical analysis, Tensile properties, Fatigue (Machanics), High temperature research.

A program to improve the mechanical properties of cast 5% chromium steel was carried out. vacuum degassing of air melted material of a composition based on that of wrought H-11 hot work die steel did not exhibit any significant benefits. A modified 5% chromium steel containing no vanadium and 2.4% molydbenum had good tensile properties and excellent toughness in cast one-inch sections. Investigation of the properties of cast 18 percent nickel maraging steel revealed that this material has high toughness and ductility in cast one-inch sections. Cast sections of maraging steel of two inches and greater exhibited a defect which seriously impaired tensile properties. Experiments to identify or eliminate the defect were unsuccessful. (Author)

AD-434 397 Div. 17
OTS price $10.50

DuPont Metals Center E. I. DuPont de Nemours and Co., Inc., Baltimore, Md.
REFRACTORY ALLOY FOIL ROLLING DEVELOPMENT PROGRAM.
Interim rept. no. 1, 15 June-15 Sep 62,
by A. W. Dana, L. J. Klingler and A. L. Mincher. 15 Sep 62, 135p.
Contract AF33 657 8912, Proj. 7 987
Unclassified report

Report on a State-of-the-Art Survey.

Descriptors: (*Refractory metals & alloys, Foils), (*Foils, Material forming), Niobium alloys, Tantalum alloys, Tungsten alloys, Processing, Rolling (Metallurgy), Tungsten, Mechanical properties, Physical properties, Welding, Reviews.

The state-of-the-art of the rolling of columbium, tantalum, and tungsten base alloys to foil is reviewed. Since the rolling of foil requires control of the entire processing sequence, consolidation, sheet rolling, properties of sheet, and factors such as fabricability and stage of development have been analyzed. Alloys of columbium, tantalum and tungsten have been recommended as candidates for rolling to foil on the remainder of the program. (Author)

AD-434 441 Div. 17
OTS price $3.60

Metals and Controls Inc., Attleboro, Mass.
STUDY OF DUCTILE COATINGS FOR THE OXIDATION PROTECTION OF COLUMBIUM AND MOLYBDENUM ALLOYS.
Bimonthly progress rept. no. 4, 1 Jan-29 Feb 64,
by E. H. Girard and J. J. Buckinski. 31 Mar 64, 37p.
Contract NOw63 0706c
Unclassified report

Descriptors: (*Metal coatings, Oxidation), (*Molybdenum alloys, Protective treatments), (*Niobium alloys, Protective treatments), (*Platinum, Oxidation), (*Platinum alloys, Oxidation), Rhodium alloys, Rhenium, Cladding, High-temperature research, Ductility, Diffusion, Microstructure, Oxygen, Air, Titanium alloys, Zirconium alloys, Tantalum alloys, Tungsten alloys, Boron compounds, Nitrides, Refractory coatings.

Oxidation loss rates for platinum and platinum-10% rhodium alloy samples were determined to be 1.98 and 2.40 microinches per hour, respectively, at 2550 F in an air flow of 480 ipm. Tests on coating-base metal composites showed coated TZM and FS-85 to be attacked differently. Molybdenum from the TZM was found to diffuse through the coating and be removed at its surface as a volatile oxide. Oxygen penetrated the coatings on the FS-85 samples in a discontinuous manner, causing blisters of oxide to be formed which eventually burst through the coating. Details of the diffusion-oxidation mechanisms remain to be determined. (Author)

AD-434 448 Div. 17
OTS price $6.60

California U., Berkeley.
EFFECT OF HIGH THERMAL RADIATION FLUX ON SEVERAL METAL ALLOYS.
Rept. for 15 June 61-15 Nov 63,
by Thomas H. Hazlett, Robert C. Eberhart and Mark J. Davis. Mar 64, 61p.
Contract AF33 616 8447, Proj. 5237, Task 523702
RTD AL TDR64 27 Unclassified report

Descriptors: (*Radiation damage, Thermal radiation), (*Alloys, Radiation damage), (*Metals, Radiation damage), Aluminum alloys, Steel, Tungsten, Thickness, Crystal structure, Recrystallization, Reflection, Hardness, Microstructure, High-temperature research, Test facilities, Controlled atmospheres.

The argon-tungsten arc image furnace was developed as a facility for testing materials under very high thermal flux densities in either a vacuum or controlled atmospheres. Commercially pure tungsten, AISI 4130 steel in the as quenched fully heat treated condition and 2024-Te aluminum alloy, were subjected to the maximum thermal flux for varying lengths of time and changes in microstructure and hardness observed. (Author)

AD-434 751 Div. 17, 25
OTS price $2.60

Carnegie Inst. of Tech., Pittsburgh, Pa.
DIFFUSION IN B.C.C. METALS,
by R. A. Wolfe and H. W. Paxton. 1 Mar 64, 26p.
Contract Nonr76008, Proj. NR031 184
Unclassified report

Descriptors: (*Diffusion, Iron alloys), (*Iron alloys, Diffusion), (*Chromium alloys, Diffusion), Crystal lattices, Crystal structure, Tracer studies, Radioactive isotopes, Iron, Chromium, Vanadium, High-temperature research, Mathematical analysis.

The present work was undertaken in an attempt to provide further diffusion data on b.c.c. metals,

and to try to understand the factors which contribute to differences in behavior between the various elements. For part of this work, the iron-chromium system was chosen since it is of considerable technological importance and data on 12% Cr and 17% Cr alloys appeared well. The diffusion of (Fe-55) in chromium was studied as an example of a more or less normal tracer element in a possibly abnormal host lattice. No data were available for vanadium, the neighbor of chromium in the periodic table, because of lack or a suitable isotope so (Cr-55) was used as a tracer in a few preliminary experiments. (Author)

AD-434 879 Div. 17
OTS price $1.10

Faraday Translations, New York.
CORROSION OF METALLIC MATERIALS IN AQUEOUS SOLUTIONS OF FLUORIDES AT HIGH TEMPERATURES,
by E. I. Antonovskaya and L. V. Takhtarova.
21 Nov 60, 6p.
AERDL T1715 Unclassified report

Descriptors: (*Corrosion, Fluorides), (*Fluorides, Corrosion), (*Corrosion-resistant alloys, Fluorides), High-temperature research, Hydrogendompounds, Ammonium compounds, Potassium compounds, Steel, Aluminum alloys, Copper alloys, Nickel alloys, Solutions, Water, Lead alloys, Heat exchangers, Acide.

AD-434 914 Div. 17, 25
OTS price $1.60

Pennsylvania U., Philadelphia.
HYDROGEN EMBRITTLEMENT RESULTING FROM CORROSION, CATHODIC PROTECTION, AND ELECTROPLATING.
Quarterly rept. no. 1,
by L. Nanis and J. McBreen. 31 Jan 64, 18p.
Contract N156 44134
Unclassified report

Descriptors: (*Hydrogen embrittlement, Mathematical analysis), (*Corrosion, Hydrogen embrittlement), (*Electroplating, Hydrogen embrittlement), (*Cathodic protection, Hydrogen embrittlement), Integral transforms, Hydrogen, Diffusion, Permeability, Fourier analysis, Iron, Stainless steel, Stresses, Theory, Heat treatment.

AD-434 939 Div. 17
OTS price $1.60

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
STUDY OF INFLUENCE OF REFRACTORY ELEMENTS ON THE SELF-DIFFUSION OF IRON WITH THE HELP OF RADIOACTIVE ISOTOPES,
by S. Z. Bolshteyn. 12 Jul 63, 19p.
FTD MT63 40 Unclassified report

Trans. from Izvestiya Akademiya Nauk SSSR, OTN, no. 12, pp. 18-27, 1955.

Descriptors: (*Iron, Diffusion), (*Diffusion, Tracer studies), Radioactive isotopes, Molybdenum, Niobium, Titanium, Vanadium, Iron alloys, Nickel, Nickel alloys, Refractory metals, Theory, Recrystallization, Grain structures (Metallurgy), Grain boundaries, High-temperature research, Solid solutions, Chemical analysis.

The relation of the coefficient of self-diffusion D of iron in iron-nickel, molybdenum, niobium, titanium and vanadium were determined. The addition of nickel and vanadium leads to an increase of the diffusion mobility of atoms of iron to a decrease of the pre-exponential multiplier and to a decrease of the energy of self-diffusion. The addition of molybdenum, niobium and titanium leads to a decrease of the diffusion mobility of iron, to an increase of the pre-exponential multiplier and to a strong increase of the heat of diffusion. There are data concerning an increase of the temperature of recrystallization and long durability of iron alloys during alloying with these elements. (Author)

AD-434 940 Div. 17, 25
OTS price $1.60

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
INVESTIGATION OF DIFFUSION OF SILICON IN CERTAIN TRANSITIONAL METALS,
by G. V. Samsonov, M. S. Kovalchenko and T. S. Verkhoglyadova. 12 July 63, 11p.
FTD MT63 39 Unclassified report

Trans. from Inzhenerno-Fizicheskiy Zhurnal, No. 3, pp. 62-67, 1959.

Descriptors: (*Silicon, Diffusion), (*Diffusion, Silicon), (*Transition elements, Silicon coatings), (*Silicon coatings, Transitional elements), Refractory coatings, Titanium, Tantalum, Molybdenum, Iron, Silicides, Hardness, Electrical properties, Phase studies, Heat of activation, High-temperature research.

AD-434 969 Div. 17
OTS price $1.10

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
MECHANICAL PROPERTIES AND TEMPERATURE OF RECRYSTALLIZATION OF SINGLE CRYSTALS OF MOLYBDENUM,
by E. M. Savitskiy and Tao Tszu-tsun. 15 July 63, 10p.
FTD MT63 43 Unclassified report

Trans. from Izvestiya AN SSSR, Otdeleniye Tekhnicheskikh Nauk, Metallurgiya I Toplivo, No. 4, pp. 133-136, 1962.

Descriptors: (*Molybdenum, Mechanical properties), (*Single crystals, Molybdenum), Zone melting, Electron beams, Cold working, Recrystallization, Transition temperature, Brittleness, Ductility, Deformation, Stresses, Strain (Mechanics), Hardness, Plasticity, Rolling (Metallurgy), Refining (Metallurgy), Purification, Impurities, Degassification, Evaporation.

AD-434 974 Div. 17
OTS price $1.60

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
DIAGRAM OF FUSIBILITY OF THE SYSTEM Ni-Cr-NiAl,
by I. I. Kornilov and R. S. Mints. 21 Nov 63, 11p.
FTD MT63 174 Unclassified report

Trans. from Doklady Akademii Nauk SSSR, 94:6, pp. 1085-1088, 1954.

Descriptors: (*Alloys, Eutectics), Phase studies, Transition temperature, Solid solutions, Aluminum alloys, Chromium alloys, Nickel alloys, Microstructure.

AD-434 978 Div. 17
OTS price $1.10

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
DEFORMATION OF METAL IN AN ULTRASONIC FIELD,

by V. P. Severdenko and V. V. Klubovich.
27 Dec 63, 7p.
FTD MT63 161 Unclassified report

Trans. from Doklady Akademii Nauk BSSR, 5:1, pp. 15-16, 1961.

Descriptors: (*Metals, Deformation), (*Deformation, Ultrasonic radiation), Plasticity, Aluminum, Stresses.

AD-434 987 Div. 17
OTS price $.50

Defense Metals Information Center, Columbus, Ohio.
SOME OBSERVATIONS ON THE ELECTRON-MICROSCOPIC FRACTOGRAPHY OF EMBRITTLED STEELS,
by W. R. Warke. 19 Feb 64, 12p. Memo. no. 187
Unclassified report

Descriptors: (*Steel, Fractography), (*Fractography, Electron microscopy), Fracture (Mechanics), Brittleness, Stresses, Corrosion, Quenching (Cooling), Fatigue (Mechanics).

Electron-microscopic fractography has recently been employed to study intergranular fracture in high-strength steels and, as a result, much interesting and useful information has been obtained. In the present memorandum, information is presented from studies using electron-microscopic fractography in the examination of fractures in high-strength steels that have been treated to produce 500 F embrittlement and temper brittleness. (Author)

AD-434 989 Div. 17
OTS price $1.60

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
INFLUENCE OF PURITY OF A METAL-BASE ON THE HEAT RESISTANCE OF AN ALLOY,
by A. A. Bochvar, Z. Z. Sviderskaya and G. P. Lazarev. 19 Dec 63, 15p.
FTD MT63 148 Unclassified report

Trans. from Issledovaniye Splavov Tsvetnykh Metallov, AN SSSR, Institut Metallurgii, Izdatel'stvo Akademii Nauk, No. 3, pp. 5-11, 1962.

Descriptors: (*Heat-resistant metals & alloys, Impurities), (*Impurities, Heat-resistant metals & alloys), Aluminum alloys, Copper alloys, Creep, Effectiveness, Hardness, Mechanical properties, Additives.

AD-434 997 Div. 17
OTS price $1.60

Foreign Technology Div., Wright-Patterson AFB, Ohio.
BEHAVIOR OF TITANIUM ALLOYS DURING CORROSION UNDER STRESS IN ACID MEDIA,
by N. D. Tomashov and V. N. Modestova. 27 Dec 63, 17p.
FTD MT63 123 Unclassified report

Trans. from Titan i Ego Splavy, 6, pp. 221-229, 1961.

Descriptors: (*Titanium alloys, Fracture (Mechanics)), (*Stresses, Corrosion), Corrosive liquids, Acids, Hydrochloric acid Nitric acid, Bromine, Chlorides, Liquid metals, Cadmium, Sulfuric acid, Phosphoric acids, Fluorides, Arc welding, Impurities, Hydrogen embrittlement, Sodium compounds.

AD-435 021 Div. 17
OTS price $3.60

IIT Research Inst., Chicago, Ill.
FRACTURE OF METALS.
Summary rept., 22 Mar 63-22 Mar 64,
by W. Rostoker. 2 Apr 64, 38p. Rept. no. B183 16
Contract DA11 0220RD3108
Unclassified report

Descriptors: (*Metals, Fracture (Mechanics)), (*Failure (Mechanics), Metals), Liquid metals, Mercury, Beryllium alloys, Copper alloys, Stresses, Temperature, Time, Metallography, Grain boundaries, Heat treatment, Brittleness, Penetration, Energy.

Delayed failure is shown to occur with high-strength metals wetted by certain embrittling liquid metals. Dispersion-strengthened and cold-worked metals are prone to delayed failure but soft, annealed metals are not. Cracking during the period of sustained loading can only be detected in the last few minutes before failure. A mechanism is proposed based on stress-accelerated intergranular penetration. Thus, failure time depends on both stress and temperature. Below a certain stress (endurance limit), temperature alone is inadequate, and failure does not occur. Certain preconditioning anneals retard and suppress delayed failure. A method is described for measuring the fracture energy of polycrystalline metals in the presence of a low-melting liquid metal. (Author)

18. MILITARY SCIENCES AND OPERATIONS

AD-433 764 Div. 18, 15
OTS price $3.60

System Development Corp., Santa Monica, Calif.
THE DISTRIBUTION OF ROUNDS FIRED IN STOCHASTIC DUELS,
by C. J. Ancker, Jr. and A. V. Gafarian.
4 Mar 64, 37p. Rept. no. SP1017 004 00
Unclassified report

Descriptors: (*Stochastic processes, Warfare), (*Warfare, Stochastic processes), (*Ammunition, Military requirements), Kill probabilities, Sampling, Operations research, Game theory, Statistical analysis, Logistics, Distribution.

This paper continues the development of the theory of Stochastic Duels to include the distribution of the number of rounds fired. Most generally, the duel between two contestants who fire at each other with constant kill probabilities per round is considered. The time between rounds fired may be either a continuous random variable or it may be constant. These two cases are treated separately. The number of rounds available to each contestant at the beginning of the duel may be limited and is a discrete random variable. Besides the distribution of rounds fired, its first two moments and right tail are obtained. In addition to general results, special cases and specific examples are worked out. (Author)

AD-433 840 Div. 18
OTS price $5.60

System Development Corp., Santa Monica, Calif.
OPERATIONS RESEARCH IN PRODUCTION OF SYSTEM TRAINING EXERCISES,
by Henry J. Zagorski and Kenneth R. Wood.
24 Feb 64, 57p. Rept. no. SP1557
Unclassified report

Presented at the Naval Post Graduate School, 17 Apr 64, Monterey, Calif.

Descriptors: (*Training, Exercise), Production, Selection, Models (Simulations), Statistical analysis, Costs, Processing.

AD-434 798 Div. 18
OTS price $9.60

Hudson Inst., Harmon-on-Hudson, N. Y.
STUDY FOR HYPOTHETICAL NARRATIVES FOR USE IN COMMAND AND CONTROL SYSTEMS PLANNING. VOLUME II. THE ALTERNATIVE NATIONAL POLICY CARD DECK.
Final rept., 1 Sep 62-31 Aug 63,
by Sara Dustin and Max Singer, ed. by William Pfaff and Herman Kahn. Sep 63, 117p. Rept. no. HI285RR
Contract AF19 628 1676, Proj. 5101
ESD TDR64 178, vol. 2 Unclassified report

Descriptors: (*Command and control systems, Scheduling), Operation, Foreign policy, Game theory, Warfare, Military strategy, Political science, Sociometrics, Simulation.

This Report presents four techniques for the systematic simulation of possible future environments within which United States command and control systems may be called upon to operate. The Report contains: (1) Twenty-three Future Worlds, or total environments, designed for use as scenario contexts; (2) 40 detailed Alternate Area Projections, for the Soviet Union, Western Europe, China, Japan, South Asia, Middle East and North Africa, Southeast Asia, Latin America, and Sub-Saharan Africa, designed as war-gaming constraints and usable in an extensive series of combinations; (3) the Extended Area Projection, a systematic method for deriving the possible detailed character of future diplomatic and strategic actors, in this case the U.S.S.R. for 1965, 1970, and 1975; and (4) the Alternative National Policy Card Deck, a propaedeutic device for devising possible United States policies to interact with the environments generated by methods (1), (2), and (3) above. (Author)

AD-435 038 Div. 18
OTS price $11.00

Hudson Inst., Harmon-on-Hudson, N. Y.
STUDY FOR HYPOTHETICAL NARRATIVES FOR USE IN COMMAND AND CONTROL SYSTEMS PLANNING VOLUME III.
Final rept. 1 Sep 62-31 Aug 63
ed. by William Pfaff and Edmund Stillman. Sep 63, 147p. Rept. no. HI285RR
Contract AF19 628 1676, Proj. 5101
ESD TDR64 178 Vol. III.
Unclassified report

Descriptors: (*Command and control systems, Scheduling), (*Warfare, Game theory), Control, Analysis, Nuclear warfare, Simulation, Foreign policy.

This Report presents four techniques for the systematic simulation of possible future environments within which United States command and control systems may be called upon to operate. The report contains: (1) Twenty-three Future Worlds, or total environments, designed for use as cenario contexts; (2) 40 detailed Alternate Area Projections, for the Soviet Union, Western Europe, China, Japan, South Asia, Middle East and North Africa, Southeast Asia, Latin America, and Sub-Saharan Africa, designed as war-gaming constraints and usable in an extensive series of combinations; (3) the Extended Area Projection, a systematic method deriving the possible detailed character of future diplomatic and strategic actors, in this case the U. S. S. R. for 1965, 1970, and 1975; and (4) the Alternative National Policy Card Deck, a propaedeutic device for devising possible United States policies to interact with the environments generated by methods (1), (2), and (3) above. Finally, an extended scenario involving the causation, initiation, and course of a series of subwars escalating to a nuclear exchange between the United States and Soviet Union, derived by method (2), is presented in toto as Volume III of this Report, together with a rudimentary indication of the wayssuch scenarios can be used to aid the design and evaluation of existing and proposed command and control systems. (Author)

19. NAVIGATION

AD-434 078 Div. 19, 12
OTS price $8.10

Pickard and Burns Inc., Needham, Mass.
ATOMIC OSCILLATOR DEVICE FOR NAVIGATION - GUIDANCE.
Interim engineering rept. no. 2,
by R. H. Woodward, L. Johnson, R. Sanborn, I. Felch and R. L. Smith. 20 Mar 64, 88p.
P and B Pub. no. 877
Contract AF33 657 11384, Proj. 4144, Task 414411
ASD TDR64 2 Unclassified report

Descriptors: (*Oscillators, Navigation), (*Atomic clocks, Oscillators), Guidance, Clocks, Cesium, Theory, Specifications, Frequency, Stability, Beams (Electromagnetic), Optics, Control systems, Signal-to-noise ratio, Electronic equipment, Electron tubes, Microwave equipment, Magnets, Instrumentation.

The second interim report presents theoretical developments, elaboration of specifications and breadboard achievements for components in the primary loop; the cesium-controlled but irrational frequency having the accuracy and stability required for the ultrastable Atomic Oscillator Device for Navigation Guidance. Experimental study of the primary loop as a whole will begin during the third interim. (Author)

AD-434 227 Div. 19
OTS price $5.60

RCA Defense Electronic Products, Camden, N.J.
DOPPLER OPTICAL NAVIGATOR.
Quarterly program rept. no. 3, 6 Dec 63-6 Mar 64,
by W. J. Hannan, L. J. Nicastro, T. E. Penn and J. Vollmer. 20 Mar 64, 59p.
Contract AF33 657 11458
Unclassified report

Descriptors: (*Doppler navigation, Lasers), (*Navigational aids, Spaceborn), Doppler effect, Guidance, Satellites (Artificial), Aerospacecraft, Atmosphere, Attenuation, Gallium compounds, Arsenides, Scattering, Velocity, Simulation.

The objective of this program is to determine the feasibility of novel laser techniques for Doppler optical navigation. The performance goal is the measurement of ground speed of a satellite, traveling at a velocity of 10,000 meters per second at an altitude of 300 miles, with an accuracy of 5 meters per second. Doppler measurements, using a laboratory Doppler simulator, verified that more than one complete cycle of Doppler shift must be generated by discrete reflecting elements for

Doppler frequency to be measured accurately. Operation of a thermoelectrically cooled gallium-arsenide laser transmitter was demonstrated. This refrigeration technique makes injection lasers practical. (Author)

AD-435 022 Div. 19
OTS price $5.60

Cornell Aeronautical Lab., Inc., Buffalo, N. Y.
HUMAN TRACKING ABILITY FOR MAXIMUM TERRAIN FOLLOWING.
Quarterly technical rept. no. 4, 1 Mar-31 May 63,
by W. J. Ruby. 31 May 63, 55p. Rept. no. 1H1715E4
Contract N6001958660
Unclassified report

Report on Project DIRECT.

Descriptors: (*Terrain avoidance, Aircraft), (*Pilots, Terrain avoidance), Low altitude, Flight paths, Display system, Human engineering, Computers, Penetration, Programming (Computers), Mathematical analysis, Tracking, Test methods, Simulation.

The primary objective of the area of effort called Terrain Avoidance is to provide a flight capability at sufficiently low clearance altitudes above the terrain that the penetrating aircraft will be protected from ground-based or airborne enemy weapons systems by taking advantage of the masking afforded due to the height variations of the terrain. (Author)

20. NUCLEAR PHYSICS AND NUCLEAR CHEMISTRY

AD-433 615 Div. 20
OTS price $5.60

Army Materials Research Agency, Watertown, Mass.
A SUBTHERMAL NEUTRON BEAM COLLIMATED BY TOTAL REFLECTION,
by Charles R. Porter. Dec 63, 55p.
Proj. 1A024401A11001
AMRA TR63 25 Unclassified report

Descriptors: (*Neutron beams, Diffraction), (*Research reactors, Design), Materials, Trajectories, Reactor moderators, Reactor cores, Reflection, Single crystals, Spectrum analyzers, Collimators, Optics, Copper, Nickel.

A method for providing an experimental beam of long wavelength neutrons was investigated. The method involved allowing neutrons to travel from the vicinity of a reactor core to the experimental area by means of a curved hollow tube. The method makes use of the phenomenon of total internal reflection of long wavelength neutrons to selectively transport subthermal neutrons the length of the tube. The tube was slightly curved so that a line-of-sight path through the tube did not exist. The tube was 20 ft long, had an internal diameter of 1.5 in., and was made of copper. A nickel-plated tube was also investigated. Wavelength spectra taken of the beam of emerging neutrons peaked in the vicinity of 3.75 A. The general shape and position of the spectrum of emerging neutrons was investigated as a function of the tube curvature, the internal finish of the tube, and the reflective material inside the tube. The range over which these parameters could be varied did not produce significant variations in the spectrum. Using nickel as the reflective material instead of copper did, however, increase the total intensity by a factor of nearly four. Gammas and fast neutrons were not able to negotiate the curvature of the tube and as a result the beam obtained was virtually free from contamination. (Author)

AD-433 618 Div. 20, 22, 13
OTS price $3.60

Ballistic Research Labs., Aberdeen Proving Ground, Md.
THE PLASTIC RESPONSE TO INTERNAL BLAST LOADING OF MODELS OF OUTER CONTAINMENT STRUCTURES FOR NUCLEAR REACTORS,
by John W. Hanna and William O. Ewing, Jr.
Jan 64, 36p.
Proj. 1M010501A006
BRL MR1530 Unclassified report

Descriptors: (*Nuclear reactors, Containment), (*Reactor safety systems, Confinement), (*Elastic shells, Deformation), Reactor shielding materials, Explosion effects, Reactor hazards, Models (Simulation), Model tests, Loading (Mechanics), Plasticity, Instrumentation, Deformation, Strain gages, Power reactors.

Results are presented of an experimental investigation of the plastic response of two geometrically scaled models of nuclear reactor outer containment vessels to internal blast loading. Tests were performed to study the ability of the containment shells to maintain integrity when subjected to large amounts of explosively released energy when unsupported (suspended in air), when half-buried in the ground, and when half-imbedded in concrete. The results show that the vessels tested will withstand a relatively large amount of explosively released energy, as compared to the maximum credible incident. expected, provided that the welds are adequate and that access or other openings are properly reinforced. (Author)

AD-433 625 Div. 20
OTS price $5.60

California U., Berkeley.
INTERACTIONS OF 17 GeV/c NEGATIVE PIONS,
by F. R. Huson and W. B. Fretter. 3 Feb 64, 52p. Rept. no. TR64 1
Contract Nonr365613
Unclassified report

Descriptors: (*Pions, Bubble chambers), Charged particles, Pair production, Photons, Particle trajectories, Protons, Nucleons, Nuclear cross sections, Scattering, Proton reactions, Elastic scattering, Detection.

AD-433 675 Div. 20
OTS price $3.60

Naval Research Lab., Washington, D.C.
IRRADIATION EFFECTS ON REACTOR STRUCTURAL MATERIALS.
Quarterly progress rept. 1 Nov 63-31 Jan 64,
by L. E. Steele, J. R. Hawthorne, C. Z. Serpan, Jr. and H. E. Watson. 15 Feb 64, 33p.
Proj. SR007 01 01, Task 0858
NRL MR1501 Unclassified report

Descriptors: (*Reactor system components, Radiation damage), Reactor fuel plates, Nuclear power plants, Ductility, Metal plates, Heat treatment, Steel, Uranium, Neutron flux, Rings, Transition temperature, Neutron detectors.

Division 20 - NUCLEAR PHYSICS AND NUCLEAR CHEMISTRY

The effects of nuclear radiation upon the properties of structural materials are discussed. Data are included on the following: (1) comparison of the asirradiated properties of ASTM Type A350-LF1 (Modified) plate and ring forging, (2) effects of various postirradiation annealing treatments on the notch ductility characteristics of ASTM Type A350-LF1 steel, (3) notch ductility properties of uranium bearing steels after irradiation, (4) neutron dosage values for the OMRE pressure vessel and grid plate, and (5) preliminary efforts in the Yankee Atomic pressure vessel surveillance program. (Author)

AD-433 735 Div. 20
OTS price $4.60

Ballistic Research Labs., Aberdeen Proving Ground, Md.
DEPENDENCE OF NEUTRON ALBEDOS UPON HYDROGEN CONTENT OF A SHIELD,
by Frank J. Allen, Arnold Futterer and William Wright. Oct 63, 50p.
RDT & E Proj. 1A022601A088
BRL 1224 Unclassified report

Descriptors: (*Albedo, Neutrons), (*Neutrons, Albedo), (*Shielding, Hydrogen), (*Hydrogen, Shielding), Neutron flux, Energy, Dose rate, Dosage, Reflection, Tables, Transmissions, Materials, Water, Polyethylene plastics, Iron, Concrete, Silicon.

Curves are presented which enable one to determine the neutron number current, number flux, energy, and dose albedos as functions of the hydrogen content of a shield material. The curves are given for eight incident energies: 0.1, 0.25, 0.50, 1.0, 2.0, 3.0, 5.0, and 14.0 Mev and four incident angles: 0, 30, 45, and 70 degrees for each energy. A method is presented by means of which one can calculate changes in neutron albedos caused by hanges in cutoff (or effective cutoff) energy. (Author)

AD-433 774 Div. 20
OTS price $1.60

Dewey, G. C. and Co. Inc., New York.
AN EXPERIMENTAL INVESTIGATION OF THE EFFECTS OF RADIATION ON THE PROPOGATION OF ELECTROMAGNETIC SIGNALS IN AIR.
Quarterly progress rept. no. 1, 1 July-30 Sep 63, by M. N. Hirsh and P. N. Eisner. 30 Sep 63, 11p.
Rept. no. R 173 1
Contract DA36-039AMC03278E
Unclassified report

Descriptors: (*Electromagnetic waves, Propagation), Air, Signals, Vacuum, Mass spectroscopy, Mass spectrum, Electronic equipment, Tests, Electrons, Measurement, Atmosphere, Gases, Charged particles, Ions, Circuits.

AD-433 928 Div. 20, 16, 30
OTS price $6.60

Naval Radiological Defense Lab., San Francisco, Calif.
AN INDEX TO U.S. NAVAL RADIOLOGICAL DEFENSE LABORATORY TECHNICAL REPORTS (TR SERIES) ISSUED FROM 1 JANUARY THROUGH 31 December 1963,
comp. by Elizabeth Budd. 14 Feb 64, 67p.
NRDL 478 Unclassified report

Descriptors: (*Indexes, Radiation hazards), (*Radiation hazards, Indexes), Radiation chemistry, Radiation measurement systems, Radiation monitors, Radiobiology, Radioactivity, Underwater explosions, Thermal radiation, X-rays, Lethal dosage, Aerobiology, Fission products, Nuclear explosions, Fission neutrons, Life expectancy, Radiological contamination, Radioactive fall out, Naval research, Shelters, Gamma rays, Neutrons, Doserate, Radiation damage, Radiation effects, Shielding.

AD-434 091 Div. 20
OTS price $5.60

Stanford Research Inst., Menlo Park, Calif.
VULNERABILITY OF MUNICIPAL WATER FACILITIES TO RADIOACTIVE CONTAMINATION FORM NUCLEAR ATTACKS,
by Hong Lee. Mar 64, 56p.
Contract OCD OS63 149, SRI Proj. IM4536
Unclassified report

Descriptors: (*Water supplies, Radiological contamination), (*Radiological contamination, Water supplies), Nuclear warfare, Civil Defense systems, Radioactive fallout, Radiation hazards, Simulation, Radiological dosage, Strontium, Radiation effects, Vulnerability.

In the event of a nuclear attack upon the United States, the surface source waters would become contaminated with radioactive nuclides carried by fallout particles. The absorbed dosage in the body tissues of humans resulting from drinking contaminated surface waters, especially after the water is processed in treatment plants, is not critical. In areas where heavy levels of fallout occur, the overriding hazard facing the survivors is external radiation. Contaminated water is a secondary problem facing survivors in the postattack environment. Also, a large proportion of the postattack population will have uncontaminated ground source water available, and, if this water is properly handled after it is drawn from wells, it will remain clean. (Author)

AD-434 092 Div. 20, 16
OTS price $15.00

Stanford Research Inst., Menlo Park, Calif.
PLANT UPTAKE OF RADIOELEMENTS FROM SOIL,
by William B. Lane, James D. Sartor and Carl F. Miller. Mar 64, 230p.
Contract OCD OS63 149, SRI Proj. IM4536, Subtask 3421A
Unclassified report

Descriptors: (*Plants (Botany), Physiology), (*Soils, Radiological contamination), (*Radiological contamination, Food), Radioactive fallout, Strontium, Soil mechanics, Calcium, Adsorption, Agriculture.

This report presents a model for predicting food crop contamination by root uptake of radionuclides. The model was tested with existing data to obtain equation constants which would permit a solution for a hypothetical contaminating event. Values for many crop-isotope combinations were estimated or assigned because of lack of data. The derived or estimated constants for important agricultural crops are summarized for computer input. Results of a nation-wide survey to obtain the exchangeable calcium content of the soil in each country of the United States are presented. (Author)

AD-434 277 Div. 20
OTS price $1.10

Duke Univ., Durham, N. C.
(No title)
Semi-annual progress rept., 1 Nov 63-30 Mar 64,

by Horst Meyer, A. B. Harris, S. Dickson, D. G. Onn and David Rorer. 30 Mar 64, 2p.
Contract Nonr1181 12
Unclassified report

Descriptors: Nuclear resonance, Hydrogen), Low temperature research, Molybdenum, Specific heat, Deuterium, Excitation, Antiferromagnetism.

AD-434 279 Div. 20
OST price $2.60

Naval Research Lab., Washington, D.C.
NRL QUARTERLY ON NUCLEAR SCIENCE AND TECHNOLOGY.
Progress rept., Apr-June 63.
1 July 63, 28p.
Unclassified report

Descriptors: (*Nuclear engineering, Reports), Nuclear physics, Nuclear structure, Groups (Mathematics), Photonuclear reactions, Electron beams, Plasma physics, Capacitors, Naval research.

AD-434 446 Div. 20
OTS price $1.10

Aerospace Information Div., Washington, D. C.
THE FIRST SOVIET NUCLEAR REACTOR.
Summary of data.
9 Mar 64, 9p.
AID P64 13 Unclassified report

Descriptors: (*Nuclear reactors, History), Graphite, Uranium, Reactor cores, Control rods, Cadmium, Neutron capture.

AD-434 785 Div. 20
OTS price $4.60

Geotechnical Corp., Garland, Tex.
PROJECT SHOAL VOLUNTEER TEAM PROGRAM,
by R. A. Weisbrich. 23 Mar 64, 44p. Technical rept. no. 64 26
Contract AF33 657 12145, Proj. VELA T4051
Unclassified report

Descriptors: (*Nuclear explosions, Underground explosions), (*Underground explosions, Experimental data), Seismic waves.

This report describes the objectives of the VELA Program and the portion of it named VELA-UNIFORM under which seismic energy from underground nuclear explosions is studied. It also describes preparations made to facilitate monitoring SHOAL and summarizes the results obtained by the Volunteer Teams monitoring this test shot. (Author)

AD-434 787 Div. 20
OTS price $8.10

Technical Operations, Inc., Burlington, Mass.
THE EFFECT OF LIMITED STRIPS OF CONTAMINATION ON THE DOSE RATE IN A MULTISTORY, WINDOWLESS STRUCTURE WITH 40 PSF WALLS AND 50 PSF FLOORS,
by Albert W. Starbird. 15 Oct 63, 82p. Rept. no. TO B63 76
Contract OCD OS62 14, Subtask 1111A
Unclassified report

Descriptors: (*Radiation effects, Structures), (*Structures, Radiation effects), (*Contamination, Structures), (*Dose rate, Contamination), Design, Radioactive fallout, Gamma rays, Experimental data, Measurement, Instrumentation.

This report extends the evaluation of the effects of limited rectangular fields of contamination on the dose rates within multistory structures to the specific case of a structure with 40 psf walls and 50 psf floors. Comparisons are made between experimentally determined results and those obtained through use of the OCD Guide for Architects and Engineers, the National Shelter Survey Computer Program, and the OCD manual entitled The Design and Review of Structures for Protection from Fallout Gamma Radiation. Recommended experimentally obtained multiplicative correction factors for accounting for limited strips of contamination are presented. Good agreement was obtained between experimentally measured and computed infinite-field above-ground dose rates and for basement dose rates at a 5-ft to 6-ft depth only. Basement measured dose rates were higher than computed values at greater depths. (Author)

AD-434 788 Div. 20
OTS price $1.10

Technical Operations Research, Burlington, Mass.
THE EFFECT OF LIMITED STRIPS OF CONTAMINATION ON THE DOSE RATE IN A MULTISTORY, WINDOWLESS STRUCTURE WITH 40 PSF WALLS AND 50 PSF FLOORS.
Summary rept. for 15 Oct 63,
by M. J. Barrett. Jan 64, 7p. Rept. no. SR1100
Contract OCD OS62 14
Unclassified report

Report on Shelter Research 1100 Protection Studies.

Descriptors: (*Radioactive fallout, Radiological contamination), (*Radiological contamination, Buildings), (*Radiation measurement systems, Radiological contamination), Models (Simulations), Dose rate, Instrumentation, Dosimeters, Shielding, Civil defense systems.

AD-434 953 Div. 20
OTS price $1.10

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
DIFFUSION OF SLOW NEUTRONS THROUGH LIQUID OXYGEN,
by S. V. Starodubtsev and B. I. Khrushchev.
24 Sep 63, 10p.
FTD MT63 82 Unclassified report

Descriptors: (*Neutrons, Diffusion), (*Liquefied gases, Oxygen), (*Oxygen, Liquefied gases), Nuclear reactors, Nuclei, Crystals, Energy, Equations, Neutron beams, Temperature, Decomposition, Theory, Functions, Distributions, Polynomials, Velocity, Density.

AD-434 964 Div. 20
OTS price $1.10

Foreign Technology Div., Wright-Patterson AFB, Ohio.
CONCERNING ELASTIC SCATTERING OF PROTONS OF LARGE ENERGIES,
by G. G. Arushanov. 17 July 63, 6p.
FTD MT63 53 Unclassified report

Trans. from Izvestiya, Akademiya Nauk Uzbekskoy SSR. Seriya Fiziko Matematicheskikh Nauk, No. 5, pp. 87-88, 1962.

Descriptors: (*Protons, Elastic scattering), Differential cross section, Energy, Mesons, Nucleons.

21. NUCLEAR PROPULSION

No Entries

22. ORDNANCE

AD-433 493 Div. 22
OTS price $1.10

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
INVESTIGATION OF THE DETONATION OF CONDENSED EXPLOSIVES,
by L. D. Landau and K. P. Stanyukovich. 6 Feb 64, 7p.
FTD TT63 1112 Unclassified report

Trans. from Doklady Akademii Nauk SSSR, 46:9, pp. 399-402, 1945.

Descriptors: (*Explosive materials, Detonations), (*Detonations, Theory), Mathematical analysis, Equations of state, Density, Thermodynamics, Shock waves, Pressure, Explosions, Tables, Tetryl, Phenols, Nitrates, Cellulose plastics, TNT.

AD-433 567 Div. 22, 2
OTS price $6.60

Naval Ordnance Lab., White Oak, Md.
HASP, INSTRUMENTED, RELEASE TO PROTOTYPE PRODUCTION FOR EVALUATION OF THE HEADS, 1.625-INCH, ROCKET, MK 1 MOD 0 AND MK 2 MOD 0,
by M. J. Parker. 13 Jan 64, 68p.
NOL TR63 272 Unclassified report

Descriptors: (*Sounding rockets, Performance (Engineering)), Atmospheric sounding, Wind, Velocity, High altitude, Rocket heads, Radiosondes, Environmental tests, Flight testing.

This report contains, with the exception of drawings and specifications, the supporting technical documentation which substantiated the release to prototype production of the instrumented High Altitude Sounding Projectile (HASP) for determining atmospheric temperature and wind velocity up to 150,000-ft altitude. The Mk 32 Mod 0 rocket motor, developed by the Bureau of Naval Weapons (RMMP), was the propulsion unit. Launching was from the 5-inch 38 gun or the LOKI tube launcher. (Author)

AD-433 591 Div. 22, 12
OTS price $2.60

Naval Missile Center, Point Mugu, Calif.
EVALUATION OF THE COMPATIBILITY OF THE AQM-37A TARGET, LAU-24/A LAUNCHER, AND A-4B LAUNCH AIRCRAFT,
by W. M. Horton. 12 Mar 64, 21p.
WEPTASK RM4501 001
NMC TM63 46 Unclassified report

Descriptors: (*Target drones, Performance (Engineering)), (*Aerial targets, Target drones), Tests, Test equipment, Jet bombers, Jet fighters, Naval aircraft, Launching, Release mechanisms.

The AQM-37A target is a preprogrammed, high-performance, air-launched, liquid-fueled, rocket-propelled, expendable missile target designed for launch from many types of military aircraft. The compatibility of the AQM-37A target, the LAU-24/A launcher, and the A-4B aircraft was evaluated. Prior to this evaluation the target had been launched only from F-3B aircraft. The evaluation, consisting of ground tests and flight tests, indicates that the centerline station of the A-4B aircraft is readily converted to a satisfactory launch platform for the AQM-37A target, within the subsonic flight regime at altitudes between 30,000 and 40,000 feet, without producing effect detectable by the pilots or through observation of films, upon the flight capabilities or characteristics of the aircraft. (Author)

AD-433 742 Div. 22
OTS price $9.10

Ammunition Engineering Directorate, Picatinny Arsenal, Dover, New Jersey.
RF ATTENUATION MEASURING TECHNIQUES,
by Frederick M. Correll. Mar 64, 103p.
AED TM1259 Unclassified report

Descriptors: (Explosives iniators, Hazards), (*Radiofrequency, Attenuators), Radiofrequency, Attenuation, Safety, Attenuators, Adapters, Measurements, Mechanical drawings.

An easily set up measuring system capable of ascertaing attenuation values up to 40 db in the frequency range from 40 mc to 10 gc, in operation at Picatinny Arsenal, is described in detail. This study also describes the necessity for measuring attenuation. (Author)

AD-433 760 Div. 22
OTS price $3.60

Ammunition Engineering Directorate, Picatinny Arsenal, Dover, New Jersey.
TEST PROGRAM TO ESTABLISH AN ACCEPTABLE NON-PROPRIETARY IGNITION CHARGE FOR THE M6 ELECTRIC BLASTING CAP.
by Dusan Georgevich. Feb 64, 32p.
AED TM1313 Unclassified report

Descriptors: (*Detonators, Charges (Explosives)), Circuits, Weight, Ignition, Pressures, Electric currents, Binders, Loading, Tests, Test methods, Firing circuits, Explosive materials, Lead compounds, Potassium compounds, Cynates, Chlorates, Charcoal, Varnishes.

This program was prepared to selt and establish acceptability of a suitable dry-loaded, non-proprietary ignition charge for the M6 Electric Blasting Cap. Weight limits and consolidating preressures for the selected ignition charge will be established and verified through tests involving the determination of ALL FIRE and NO FIRE currents and the ability of the caps to fire when connected in a series circuit. (Author)

AD-433 819 Div. 22
OTS price $1.60

Ogden Air Materiel Area, Hill Air Force Base, Utah.
SHELF AND SERVICE LIFE TEST ON M-4 DIMPLE MOTOR, PART NUMBER 147740, AIM-4A/4C/26A/26B,
by Clarence R. McGraw. Mar 64, 18p.
OOY TR64 886 Unclassified report

Descriptors: (*Explosive actuators, Stability), Life expectancy, Storage, Guided missile components.

This test project was developed to determine shelf and service life of the M-4 Dimple Motor.

The possibility exists that this is the first specific data to be gathered on the dimple motors. In the past, no difficulties or malfunctions were reported or noted. The results of this test definitely indicate deterioration and instability which accompanies age and varying temperatures. (Author)

AD-433 953 Div. 22
OTS price $1.60

Ammunition Engineering Directorate, Picatinny Arsenal, Dover, N.J.
PROBABILITY OF PREVENTION OF EXPLOSIVE PROPAGATION AND PERSONNEL INJURY BY PROTECTIVE WALLS,
by Charles E. McKnight. Mar 64, 18p.
AED TM1311 Unclassified report

Presented at the 145th National Meeting of the American Chemical Society, Sep 63, New York.

Descriptors: (*Blast, Damage), (*Personnel, Safety), (*Explosions, Probability), Explosive materials, Processing, Shelters, Design, Kinetic theory, Sensitivity, Storage, Propagation.

Given the occurrence of an initial large detonation in a storage or manufacturing facility for explosives, the probability of the spread of detonation can be estimated as a function of explosive quantity, barrier strengths and separation distances. Conversely these parameters can be established at values consistent with predetermined probabilities for safety. The mechanisms of detonation propagation are classified and means described for assessing the hazard associated with each. The analysis of detonation over-all probability provides a means of either automatic computer treatment or manual calculation of safety and it results in an index of safety for the judging of protective buildings, walls and magazines. (Author)

AD-434 064 Div. 22
OTS price $3.60

General Electric Co., Burlington, Vt.
FLUID TIMER FOR ORDNANCE APPLICATIONS.
Quarterly rept. no. 2, 1 Oct-31 Dec 63,
by E. B. Krulewich and R. A. Kantola.
28 Jan 64, 32p. Document no. 64APB10
Contract DA19 020AMC0213A, Proj. IR542709D362
Unclassified report

Descriptors: (*Fluids, Clocks), (*Clocks, Fluids), Amplifiers, Oscillators, Temperature, Pressure, Sensitivity, Frequency, Determination, Fluid mechanics, Ordnance.

This report describes the work carried out during the second quarter of a program to develop a fluid timer demonstrator. The demonstrator uses fluid amplifiers without moving parts. Activity during the second quarter was concentrated on perfecting the counter and determining the controlling factors behind the oscillator frequency variation with temperature and pressure. Two general approaches for reducting the temperature sensitivity of an oscillator are being investigated. (Author)

AD-434 126 Div. 22
OTS price $2.60

Ammunition Engineering Directorate, Picatinny Arsenal, Dover, N.J.
CONSIDERATIONS OF THE VULNERABILITY OF ELECTRICALLY INITIATED EXPLOSIVE SYSTEMS,
by Donald E. Seeger. Mar 64, 22p.
AED TR3155 Unclassified report

Descriptors: (*Explosives initiators, Vulnerability), Hazards, Safety, Exploding wires, Design, Electric igniters, Electrical properties.

The paper discusses means of controlling, through operation procedures and design, accidental functioning of an explosive system. It describes mechanical activation as well as electrical (hot-wire, film-bridge, exploding-bridgewire) systems, comparing them in tefms of invulnerability. An exploding-bridgewire initiator was found to be the least vulnerable electric initiatpr. (Author)

AD-434 140 Div. 22
OTS price $1.60

Army Frankford Arsenal, Philadelphia, Pa.
MEASUREMENT OF M15 ELEVATION QUADRANT COUNTER SHAFT SPEED UNDER LABORATORY CONDITIONS,
by David Marcus and Charles R. Presbury.
Jan 64, 13p.
AFA MR M64 22 1 Unclassified report

Descriptors: (*Fire control system components, Malfunctions), Howitzers, Self propelled guns, Elevating gear, Counting methods, Fire control systems, Measurement, Test methods.

Deficiencies possibly resulting from excessive speed under normal field operating conditions, were observed on the M15 Elevation Quadrant Counter. Therefore, a program to experimentally measure maximum speeds of the counter shaft was undertaken. Results of the investigation indicated that revolutions per minute attained were extremely high for the type of counter used. Several recommendations are made concerning continued investigations on the counter. (Author)

AD-434 301 Div. 22
OTS price $6.60

Naval Radiological Defense Lab., San Francisco, Calif.
HYDRA PROGRAM HYDRA IIB SERIES. INVESTIGATION BY WATER SAMPLING OF THE INTERNAL STRUCTURE OF COLUMNS RESULTING FROM SMALL SHALLOW UNDERWATER EXPLOSIONS,
by K. W. Kaulum. 13 Sep 63, 69p.
Task 10 002
NRDL TR706; DASA 1440
Unclassified report

Descriptors: (*Underwater explosions, Test methods), (*Water, Sampling), Explosion effects, Underwater-to-air, Photographs, Mathematical analysis, Explosion gases, Explosion bubbles.

The internal structure of the columns from one-pound high-explosive shallow underwater explosions has been investigated by means of water sampling for several shallow charge depths. Water samples taken at varying times across the column diameter at several heights up to 8 ft. are used to compute the thickness of the water seal between the explosion product gas bubble and the air of the initial column formation and the total volume of water ejected into the column. These are compared with computed seal thickness and water volume assuming outward flow

of the water over the charge to be only radial in direction. Sampling data is used along with above-and below-surface photographs to construct a time sequence of the column structure for charge depths of 5.5 and 12 in. It is shown that true radial flow of water over the charge occurs only during the very early initial bubble expansion and is soon supplanted by a tangential flow which converges well above the surface. The converging water results in both an upward jet which rises high into the air and a downward jet which penetrates through the underwater bubble. (Author)

AD-434 447 Div. 22
OTS price $4.60

Air Force Systems Command, Washington, D. C.
GROUND SAFETY: EXPLOSIVE SAFETY HANDBOOK,
28 Feb 64, 49p.
AFSC P127 1 Unclassified report

Descriptors: (*Explosive materials, Safety), (*Handbooks, Explosive materials), Military personnel, Handling, Deflagration, Propellants, Ammunition, Detonators, Pyrotechnics, Guided missiles, Hazards, Shelters.

The purpose of this pamphlet is to provide ready elementary basic facts about explosives, their ingredients, the hazards they possess, and guidance to workers to ward against hazards. (Author)

AD-434 580 Div. 22
OTS price $1.60

Army Frankford Arsenal, Philadelphia, Pa.
EXAMINATION OF ROTATING BANDS FROM 155MM PROJECTILE, HE, M107, FIRED WITH PROPELLANT CHARGE XM119,
by R. E. Hantho. Oct 63, 16p.
AFA T64 31 Unclassified report

Descriptors: (*Rotating bands, Projectiles), High-explosive ammunition, Markers, Smoke projectiles, Howitzers, Self-propelled guns, Spin, Wear resistance, Pressure, Velocity, Propelling charges.

This study was conducted to determine the adequacy of the rotating band, particularly band retention, of the standard 155mm M107 shell when fired with propelling charge XM119 from the 155mm Howitzer Self-Propelled M109 (T196E1). Rotating bands from sixteen recovered M107 shell were examined. The bands imparted full spin to the projectile, but showed varying amounts of wear proportional to the pressure and velocity level. This amount of wear did not adversely affect the velocity or range dispersions. Band fly off was primarily attributed to poor banding practice and lack of band seat undercuts. If the percentage of bands fly off warrants rebanding, widening of the band seat and inclusion of 15 degree band seat undercut is recommended. (Author)

AD-434 660 Div. 22
OTS price $4.60

Ammunition Engineering Directorate, Picatinny Arsenal, Dover, N.J.
DEVELOPMENT OF XM124 (GREEN GAG) PROPELLING CHARGE FOR THE 175MM GUN,
by John J. Vogel and Kenneth Russell. Feb 64, 50p.
AED TR3148 Unclassified report

Descriptors: (*Propelling charges, Design), Ammunition compounds, Propellants, Ballistics, Velocity, Peformance (Engineering), Ignition, Powder bags.

A green bag charge was developed using an 0.037 web, MP, M6 Propellant at a charge weight of about 17 pounds. Ignition is by means of a base pad containing eight ounces of Al Black Powder. Ballistic reproducibility, both round to round and occasion to occasion was excellent. The green bag charge represents a significant performance improvement for Charge 1 for the 175mm Gun. The green bag charge concept complicates the logistic problem for the 175mm Gun since it can only be provided as a separate (and new) item of issue. However, its use should yield a substantial operational savings paritcularly for practice or training use. (Author)

AD-434 702 Div. 22
OTS price $3.60

Ballistic Research Labs., Aberdeen Proving Ground, Md.
RESPONSE OF SUBMERGED SPHERICAL SHELLS TO INTERNAL BLZST LOADING,
by W. E. Baker, J. W. Hanna and J. D. Patterson.
Dec 63, 39p.
Proj. 1M010501A006
BRL 1231 Unclassified report

Descriptors: (*Spheres, Underwater explosions), (*Structural shells, Underwater explosions), Theory, Shock (Mechanics), Underwater, Nuclear reactors, Containers, Thickness, Vibration, Measurement, Pressure, Steel, Blast, Tests, elasticity, Data, Experimental data.

This report presents the results of experiments on the response of this spherical shells submerged in water to blast from internal explosive charges, and compares the resuldts with theory. In addition, results of measurements of the underwater shock transmitted from the shells into the surrounding water are reported and these shock intensities are compared to direct underwater shocks. (Author)

AD-434 821 Div. 22, 30
OTS price $1.60

Naval Ordnance Lab., White Oak, Md.
ESTIMATION OF HIGH AND LOW PROBABILITY EED FUNCTIONING LEVELS,
by L. D. Hampton, J. N. Ayres and T. Kabik.
Apr 64, 12p.
NOL TR63 266 Unclassified report

Descriptors: (*Electric detonators, Explosives initiators), Test methods, Sensitivity, Statistical analysis, Sampling, Electromagnetic properties, Probability, Reliability, Safety.

Predicting very high or low EED response probabilities usually requires extrapolation from limited data. Extrapolation errors will be increased by inappropriate test plans or statistical treatment. Various test plans are discussed. Possible new prediction techniques are suggested. The necessity for careful design of experiment is stressed. (Author)

AD-434 831 Div. 22
OTS price $4.60

Ammunition Engineering Directorate, Picatinny Arsenal, Dover, N.J.
EVALUATION OF LOW TEMPERATURE TEST PROCEDURES

FOR ELECTROEXPLOSIVE DEVICES,
by Leonard Shainheit. Mar 64, 48p.
AED TR3139 Unclassified report

An expanded version is available to U.S. Military Organizations only as AD-434 832L.

Descriptors: (*Explosive initiators, Performance (Engineering), Low temperature research, Sensitivity, Tests, Test methods, Reliability, Statistical analysis, Experimental data, Temperature, Time, Electric currents.

Constant current sensitivity data, for ambient temperature conditions, were available for M6 Electric Blasting Caps. To further characterize the sentivity of this blasting cap, Bruceton constant current sensitivity tests at low temperature, were conducted. Usually, in work of this type, the item is removed from the conditioning apparatus and placed in a firing chamber for functioning. Because the item under test may warm between the time it is removed from the conditioning box and fired, a study was initiated to ascertain if such a procedure provides valid low temperature information. This report summarizes the results of the investigation and reports the low temperature sensitivity characteristics of M6 Blasting Cap. (Author)

AD-434 955 Div. 22
OTS price $1.10

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
EXPERIMENTAL DETERMINATION OF THE EXPONENT OF POLITROPIC PRODUCTS OF DETONATION FOR CERTAIN LIQUID EXPLOSIVES,
by V. A. Odintsov and V. S. Solove'ev. 17 Dec 63, 7p.
FTD MT63 79 Unclassified report

Trans. from Izvestiya Vysshikh Uchebnykh Zavedeniy, Fizika, no. 5, pp. 86-88, 1962.

Descriptors: (*Explosive materials, Detonations), (*Detonations, Explosive materials), Liquids, Detonation waves, Compressive properties, Mathematical analysis, Mixtures, Nitrogen compounds, Tetroxides, Nitrates, Benzene, Xylenes, Fuels.

AD-434 956 Div. 22
OTS price $1.60

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
CONCERNING A DEVICE FOR THE DETONATION OF LIQUID EXPLOSIVES,
by A. N. Dremin, O. K. Rozanov and V. S. Trofimov. 19 July 63, 11p.
FTD MT63 78 Unclassified report

Trans. from Zhurnal Prikladnoy Mekhaniki I Tekhnicheskoy Fiziki, No. 1 pp. 130-132, 1963.

Descriptors: (*Explosive materials, Shock waves), (*Detonation waves, Liquids), Propagation.

AD-435 017 Div. 22
OTS price $1.10

Naval Ordnance Lab., White Oak, Md.
GUIDED MISSILE PROPULSION SYSTEM HAZARDS OF ELECTROMAGNETIC RADIATION TO ORDNANCE (HERO) RF CHARACTERISTICS OF ELECTRO-EXPLOSIVE DEVICES.
Quarterly progress rept., 1 Oct-31 Dec 63.
17 Mar 64, 9p.
Task NOL 443 Unclassified report

Descriptors: (*Explosives initiators, Hazards), (*Hazards, Electromagnetic waves), Radio waves, Research program administration, Statistical distributions, Probability.

AD-435 018 Div. 22
OTS price $1.60

Naval Ordnance Lab., White Oak, Md.
DESIGN OBJECTIVES AND DESIGN TESTS OF MINIATURE SQUIB-ACTUATED SWITCH,
by M. J. Prebilic, Jr. May 64, 18p.
NOL TR63 254 Unclassified report

Descriptors: (*Explosive initiators, Electric switches), Design, Tests, Vibration, Storage, Temperature, Humidity, Shock waves, Pressure, Vacuum.

A series of miniature squib-actuated switches was designed and developed for the Navy by the Atlas Chemical Industries, Incorporated, Wilmington, Delaware. The technical direction of this work was under the cognizance of the U. S. Naval Ordnance Laboratory, White Oak (NOL (WO)). A survey of projects at NOL (WO) early in the program led to the compilation of a list of design parameters. Tests summarized herein were conducted which successfully proved out these design parameters. The results permitted several modifications of the switch to be released for evaluation. Evaluation is scheduled to be completed before July 1964; preliminary test results should be available by January 1964. (Author)

AD-435 020 Div. 22, 26, 30, 18
OTS price $1.60

Ogden Air Materiel Area, Hill Air Force Base, Utah.
TEST FIRING 20MM AMMUNITION, HEI FOR MAP GERMANY,
by Lee H. Thompson. Apr 64, 15p.
OOY TR64 115 Unclassified report

Descriptors: (*High explosive ammunition, Firing tests (Ordnance)), (*Incendiary ammunition, Firing tests (Ordnance)), Aircraft ammunition, Auto ignition, Aircraft guns, High altitude, Transonic, Scheduling, Aerial gunnery, Antiaircraft gunnery, Production, Quality control, Reliability, Malfunctions, Acceptability.

The purpose of this test was to observe the test firing of 20MM HEI European manufactured ammunition during aerial firing for spontaneous functioning, failure to fire-out and other malfunctions that might occur. There were 1120 rounds of ammunition available for the test. It was concluded that the ammunition examined in this investigation was serviceable and should be used without restrictions. (Author)

23. PERSONNEL AND TRAINING

AD-434 031 Div. 23, 28
OTS price $7.60

RAND Corp., Santa Monica, Calif.
COMPUTER PERSONNEL RESEARCH GROUP PROGRAMMER

PERFORMANCE PREDICTION STUDY,
by Robert N. Reinstedt, Beulah C. Hammidi, Sherwood H. Peres and Evelyn L. Ricard. Mar 64, 71p. Memo no. RM4033PR
Contract AF49 638 700
Unclassified report

In cooperation with Sandra Corp., Albuquerque, N. Mex.

Descriptors: (*Computer, Personnel), (*Programming (Computers), Personnel), Mathematical prediction, Aptitude tests, Job analysis, Performance tests.

AD-434 572 Div. 23
OTS price $12.50

Operations Research, Inc., Silver Spring, Md.
THE CAPRI SYSTEM FOR NAVAL MANPOWER PLANNING AND CONTROL. VOLUME II. COMPUTER PROGRAM SPECIFICATIONS,
by Robert J. Byer, Ronald W. Hardy, Edward J. Lynch, Jr. A. Russell Morse, Jr. and Michael W. Pulscak. Nov 63, 172p. Technical rept. no. 235, 64 34
Contract Nonr 394900
Unclassified report

Descriptors: (*Personnel, Programming (Computers)), Networks.

This report contains computer-programming specifications applicable to the billets and inventory (B&I) and the general design parameters of the network planning and analyses (NP&A) subsystems. Documentation for the B&I subsystem includes a run description, system flow chart, and input and output formats for each program in the system. Logical flow diagrams have been specified for the more complex computer programs to better illustrate internal processing details. General system design parameters are included to illustrate the general sophistication and capabilities of the PERT III program to be used in the NP&A subsystem. (Author)

AD-434 816 Div. 23
OTS price $3.60

Dunlap and Associates, Inc., Darien, Conn.
TRAINING ANALYSIS PROCEDURE (TAP), VOLUME I: THEORETICAL DEVELOPMENT,
by Charles E. Van Albert, Gabriel G. Jeantheau, Jack T. Gorby and Jack A. Parrish. Jan 64, 36p.
Contract N61339 1169
NTDC 1169 1 Unclassified report

Descriptors: (*Training devices, Naval training), (*Naval training, Theory), (*Training devices, Design), (*Naval training, Communication theory), Job analysis, Costs, Instruction manuals, Analysis, Test methods, Time, Performance tests, Operation, History, Mathematical analysis, Probability, Experimental data.

This report contains the methodological development of a technique known as Training Analysis Procedure (TAP). This method has been developed primarily for the use of Training Situation Analysis (TSA) teams of the Naval Training Device Center. TAP is intended to be a working tool. Task performance is quantitatively defined, for purposes of TAP, in terms of the time required for the operator to perform the task and the probability that the task is performed accurately. Task training can influence either performance time, performance accuracy, or both. System improvement resulting from task training is defined as the percentage change in the number of successful system operations accomplished in a given length of time. The figure of merit adopted for a task is the improvement in system performance resulting from training for a given task. The selection of a task for incorporation into the system training environment is based on the highest ratio of task's figure of merit to the cost of the equipment required to train for the task. (Author)

AD-434 825 Div. 23, 28, 6
OTS price $4.60

Research Lab. of Electronics, Mass. Inst. of Tech., Cambridge.
SIGNAL DETECTION BY HUMAN OBSERVERS.
Final rept. 1956-1963
by John A. Swets and David M. Green. Oct 63, 49p.
Contracts AF19 604 1728 and AF19 604 7459, Proj. 7682, Task 76822
ESD TDR64 174 Unclassified report

Descriptors: (*Operator (Personnel), Performance tests), (*Performance tests, Detection), (*Detection, Theory), Decision making, Sound signals, Reviews, Abstracts, Military publications, Military psychology, Probability, Psychometrics, Visual signals, Audiometry.

This report describes the research, during the years from 1956 to 1963, of the Psychophysics Group of the Psychology Laboratory and the Research Laboratory of Electronics, Massachusetts Institute of Technology. Section I of this report gives relevant administrative information; Section II describes the general objectives of the research. Section III and V give abstracts of published papers and of papers presented at meetings of professional societies. (Author)

AD-434 859 Div. 23, 30, 28, 12
OTS price $13.50

Operations Research Inc., Silver Spring, Md.
THE BUREAU OF NAVAL PERSONNEL NEW DEVELOPMENTS HUMAN FACTORS PROGRAM,
by V. Owen Wayman and Daniel B. Jones. Feb 64, 198p. Rept. no. ND64 51, TR237
Contract Nonr394900
Unclassified report

Descriptors: (*Naval personnel, Training), (*Maintenance personnel, Job analysis), Tests, Production, Operation, Scheduling, Labor, Classification, Selection, Management (Engineering), Military requirements, Human engineering, Personnel management, Maintenance, Weapon systems.

AD-434 922 Div. 23, 28
OTS price $1.10

Naval School of Aviation Medicine, Pensacola, Fla.
PERSONALITY ORIENTATION AND SUCCESS IN NAVAL AVIATION TRAINING,
by Richard W. Shoenberger. 12 Dec 63, 7p.
NAVMED MR005 13 3003, 38
Unclassified report

Descriptors: (*Military psychology, Aviation personnel), (*Aviation personnel, Naval training), (*Naval training, Naval aviation), Personality, Social communication, Mathematical prediction, Selection, Analysis, Reliability, Achievement tests, Measurement, Standards, Behavior.

The relationship between personality orientation,

as measured by Bass' SIT Inventory, and success in naval aviation training was investigated. This was done as an evaluation of the SIT Inventory as a possible addition to the aviation selection test battery. Results showed that SIT scores bear little relationship to success in naval aviation training, and it was concluded that the addition of the SIT Inventory to the selection battery would not increase prediction validity. (Author)

AD-435 032 Div. 23
OTS price $3.60

Training Research Lab., U. of Illinois, Urbana.
SOME EDUCATIONAL PROBLEMS AND PROSPECTS OF A SYSTEMS APPROACH TO INSTRUCTION,
by Lawrence M. Stolurow. Mar 64, 33p. Technical rept. no. 2
Contract Nonr3985 04
Unclassified report

Descriptors: (*Education, Models (Simulations)), (*Education, Design), (*Education, Teaching machines), (*Teaching machines, Learning), Automation, Learning.

A ststems approach to instruction can have many implications. The two basic ones considered here were its contributions (a) to research on instruction and (b) to instruction as an important school process. The primary impact of the systems approach is toward the research. Also undergoing increasingly active development, however, is the work on school applications of the systems approacch. Probably the most active and important developments relate to the models of instruction. Early efforts at models have resulted in several different kinds that are being used. The prospects for the future seem particularly challanging and interesting. Among these new developments the computer seems particularly promising. Several ways in which it could promote understanding of instruction and impliment instruction were described. (Author)

24. PHOTOGRAPHY AND OTHER REPRODUCTION PROCESSES

AD-433 502 Div. 24, 8
OTS price $3.60

General Electric Co., Syracuse, N. Y.
MATRIX CONTROLLED DISPLAY DEVICE.
Interim development rept. no.3, 15 Dec-15 Mar 64. 24 Mar 64, 39p.
Contract NObsr89334, Proj. SR080301 Task 9475
Unclassified report

Descriptors: (*Display systems, Optical images), (*Optical equipment, Photographic recording media), Surfaces, Deformation, Oils, Thermoplastics, Prisms (Optics), Feasibility studies, Photographic recording systems, Circuits, Surface properties, Photographic equipment, Optical scanning.

Progress is reported on the development of a feasibility model of large screen, matrix controlled display device using in-air surface deformation recording the TIRP (Total Internal Reflection Prism) projection techniques. Results of in-air recording tests on a deformable medium of thermoplastic and oil are discussed. It is shown that writing rates of 100 microseconds per line are achievable with in-air thermoplastic recording. Problems in thermoplastic development and reuseability are discussed. It is shown that in-air recording can be controlled by and X-Y matrix. A modification to the TIRP optical system, required to provide individual display elements with oil recording, is discussed. (Author)

AD-433 779 Div. 24
OTS price $3.60

Ballistic Research Labs., Aberdeen Proving Ground, Md.
A PULSE OPERATED SHUTTER SYSTEM FOR AN AERIAL CAMERA WITH CELESTIAL ORIENTATION,
by Richard G. Reitz. Oct 63, 35p.
Proj. 1E2502060240
BRL MR1533 Unclassified report

Descriptors: (*Aerial cameras, Camera shutters), Photogrammetry, Geodesics, Astronomical cameras, Topographic cameras, Synchros, Solenoids, Gears, Synchronizing switches.

A pulse operated shutter system was developed for use with an aerial camera with celestial orientation. The shutter system provides for synchronization of a celestial and a terrestrial photograph to within .001 second of one another. Exposure durations of .010, .005, .003, and .002 second are available. (Author)

AD-433 801 Div. 24
OTS price $1.60

Aeronautical Photographic Experimental Lab., Naval Air Material Center, Philadelphia, Pa.
TEST AND EVALUATION OF TA-7M CAMERA MANUFACTURED BY AEROJET DELFT CORPORATION.
31 Dec 63, 17p.
NADC AP 6312 Unclassified report

Descriptors: (*Photographic reconnaissance, Low altitide), (*Aerial cameras, Low altitude), Aerial reconnaissance, Jet fighters, Image motion compensation, Flight testing, Performance (Engineering), Aerial photographs.

AD-434 400 Div. 24
OTS price $2.60

Army Map Service, Washington, D. C.
THE ASTROGRAPHIC ACCURACY OF A RECONNAISSANCE CAMERA,
by Frederick W. Fallon. Aug 63, 25p.
AMS TR36 Unclassified report

Descriptors: (*Aerial cameras, Optical properties), Surface-to-space, Stars, Position finding, Photographic plates, Photogrammetry, Photographic images, Measurement, Astronomical cameras, Errors, Mathematical analysis.

The optical properties of the K-17 aerial reconnaissance camera were studied to determine the accuracy to which such a camera can be used to determine the position of a point of light on the celestial sphere, relative to the known, fixed positions of the stars. This accuracy is limited by the degree to which the camera plate accurately records the true positions of the stars, and the accuracy to which the plate can be measured. The camera is found to record star

positions with an accuracy of 4 - 5 min. of arc whether guided or unguided. Increasing the number N of stars used in the solution above 50 makes little improvement in the residuals. Using stars of a narrow magnitude range near the limiting magnitude of the plate improves the solution substantially. (Author)

AD-434 769 Div. 24
OTS price $2.60

Manchester U. (Gt. Brit.).
RESEARCH STUDY AND DEVELOPMENT OF 1-METRE MIRROR TELESCOPE FOR LUNAR AND PLANETARY PHOTOGRAPHY.

Annual summary rept. no. 3,
by Zdenek Kopal. Aug 63, 21p.
Contract AF61 052 400
AFCRL 63 949 Unclassified report

Descriptors: (*Astronomical cameras, Mirrors), Optical equipment components, Optical properties, Monochromatic light, Moon, Infrared photography, Photography, Venus, Jupiter, Saturn, Telescopes.

Optical tests were made of the 43 in. mirror and Cassegrain secondaries. The telescope was used on a preliminary mounting for monochromatic photography of the Moon in the UV and infrared through interference filters and for planetary photography using a Barlow lens. (Author)

25. PHYSICS

AD-433 478 Div. 25, 15
OTS price $1.60

Mathematics Research Center, U. of Wisconsin, Madison.
A SOLUTION OF EINSTEIN'S FIELD EQUATIONS FOR A ROTATING, STATIONARY, AND DUST-FILLED UNIVERSE,
by James P. Wright. Dec 63, 13p. Technical summary rept. no. 448
Contract DA11 0220RD2059
Unclassified report

Descriptors: (*Field theory, Equations), Gravity, Relativity theory, Differential equations, Linear systems.

The solution of Einstein's field equations for a line element is found. The density may be a function of position, and the cosmological constant is not necessary to have a definite density. The solution reduces to that of Godel if the variable is constant. If the requirement for an empty universe is made, the solution is conformally flat. The characteristics of the conformal curvature tensor are also obtained. (Author)

AD-433 479 Div. 25
OTS price $4.60

Electrical Engineering Research Lab., U. of Texas, Austin.
IONOSPHERIC TRANSMISSION OF TRANSVERSELY PROPAGATED PLANE WAVES AT MICROPULSATION FREQUENCIES AND THEORETICAL POWER SPECTRUMS,
by C. E. Prince, Jr. and F. X. Bostick, Jr.
28 Feb 64, 1v. Rept. no. 133
Contract Nonr375 14
Unclassified report

Descriptors: (*Microwaves, Ionospheric propagation), Equations, Tensor analysis, Attenuation, Power, Magnetic fields, Electric fields, Wave transmission, Shock waves, Sunspots, Diurnal variation, Electron density, Temperature, Ionosphere, Models (Simulations).

From attenuation and phase constants for plane waves in a partially-ionized magnetopionic medium, the resultant surface magnetic field for discrete, constant-amplitude input signals at an outer boundary is calculated and presented as power spectra. The ionosphere is assumed stratified, and the only mode considered is the extraordinary mode, propagating at 90 degrees with respect to the earth's magnetic field. The results are discussed with reference to experimental power spectra. (Author)

AD-433 509 Div. 25
OTS price $1.10

Ohio State Univ., Columbus, Research Foundation.
AN INVESTIGATION OF INTERDIFFUSION IN METALLIC SINGLE CRYSTALS.
Rept. for 15 Nov 63-15 Feb 64,
by F. Fraikor, Y. Liu, G. W. Powell, J. P. Hirthand and V. Ruth. Feb 64, 2p.
Contract AF33 657 9996, Proj. 7351, Task 735101
Unclassified report

Descriptors: (*Metallic crystals, Diffusion), (*Single crystals, Alloys), (*Dilatometers, Calibration), Crystal growth, Gold, Silver, Copper, Platinum, Electrolytic polishing, Cutting tools.

This research effort has been concerned with the following: (1) seeking out and correcting the cause of the anomalous behavior of the gold single crystals in the dilatometer; (2) growth of crystals for the diffusion studies, and construction of apparatus for cutting and polishing these crystals; and (3) construction and testing of apparatus for the preparation of thin films from the diffusion couples. (Author)

AD-433 527 Div. 25
OTS price $2.60

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
INVESTIGATION OF THE INCREMENT OF NEUTRON FLUX DENSITY OBTAINED IN THE BREEDING ZONES BY THE ADDITION OF EXTRA REFLECTORS MADE OF VARIOUS SUBSTANCES,
by M. N. Nikolayev and A. V. Zvonarev.
10 Feb 64, 25p.
FTD TT63 977 Unclassified report

Trans. from Issledovaniye Podrova Neytronnogo Potoka V Zonakh Vosproizvodstva, Sozdavayemogo Dopolitel'nymi Otrazhatelyami Iz Razlichnykh, 29 pp. 1963.

Descriptors: (*Neutron flux, Density), Measurement, Shielding, Reflectors, Iron, Uranium, Beryllium, Thickness, Materials, Tables.

AD-433 534 Div. 25
OTS price $1.60

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
PROBLEMS OF HIGH-TEMPERATURE THERMOPHYSICS,
by V. A. Kirillin. 3 Dec 63, 12p.
FTD TT63 1090 Unclassified report

Vestnik AN SSSR, No. 2, pp. 38-43, 1963.

Descriptors: (*High-temperature research, Physics), Thermoelectricity, Heat transfer, Materials, Liquid metals, Organic compounds, Nitrates, Nitrides.

AD-433 536 Div. 25
OTS price $1.10

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
HEAT CONDUCTION IN A TWO-LAYER SYSTEM,
by S. M. Kotlyar. 9 Jan 64, 7p.
FTD TT63 1135 Unclassified report

Trans. from Inzhenerno-Fizicheskiy Zhurnal, 6:8, pp. 37-40, 1963.

Descriptors: (*Thermal conductivity, Boundary layer), Heat transfer, Boundary value problems, Partial differential equations, Integral equations.

AD-433 547 Div. 25
OTS price $1.60

Harvard Coll., Cambridge Mass. Observatory.
SHOCK TUBE SPECTROSCOPY LABORATORY.
Annual rept.,
by W. H. Parkinson and E. M. Reeves. 1963, 9p.
Contract Nonr1866 48
Unclassified report

Descriptors: (*Shock tubes, Design), Measurement, Temperature, Materials, Stainless steel, Oscillators, Vacuum apparatus, Quartz, Lithium compounds, Fluorides, Optics, Absorption spectrum, Calibration, Solids, Gases.

AD-433 560 Div. 25
OTS price $1.60

Aerospace Corp., Los Angeles, Calif.
ERRORS IN THE EVALUATION OF MOMENTS OF A

Division 25 - PHYSICS

PARAMAGNETIC RESONANCE LINE SHAPE,
by Henry S. Judeikis. 13 Jan 64, 19p. Rept. no. TDR269 4240 30 5
Contract AF04 695 269
SSD TDR64 2 Unclassified report

Descriptors: (*Paramagnetic resonance, Line spectrum), (*Line spectrum, Paramagnetic resonance), Errors, Mathematical analysis, Atomic spectroscopy, Equations.

The systematic errors inherent in the numerical evaluation of the various moments of an experimental paramagnetic resonance line shape are discussed as a function of the choice of the arbitrary cutoff of wing contributions. Lorentz and Gaussian first derivative line shapes are used as models. Expressions for the zeroth, second, and fourth moments of these line shapes are derived in terms of generalized coordinates, and the arbitrary cutoff. Use of the generalized coordinates, which contain parameters related to easily measured experimental quantities, permits application of the results to any line shape of the Lorentz or Gaussian form. (Author)

AD-433 580 Div. 25, 20
OTS price $1.10

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
DIFFUSION OF PI-MESONS IN HE3 AND HE4,
by N. V. Dushin. 21 Jan 64, 7p.
FTD TT63 1093 Unclassified report

Trans. from Nauchnyye Doklady Vysshey Shkoly. Fiziko-Matematicheskiye Nauki, no. 2, pp. 162-165, 1958.

Descriptors: (*Pions, Diffusion), Helium, Nuclear spins, Isotopes, Differential cross sections, Quantum mechanics.

AD-433 584 Div. 25
OTS price $1.10

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
INVESTIGATION OF PHOTO EXCITED TRIPLET STATES OF POLYATOMIC MOLECULES BY THE EPR AND PHOSPHORESCENCE METHOD,
by A. K. Piskunov and R. N. Nurmukhametov.
28 Feb 64, 8p.
FTD TT64 183 Unclassified report

Trans. for Izvestiya An SSSR. Seriya Fizicheskaya, 27:5, pp. 634-637, 1963.

Descriptors: (*Polyatomic molecules, Excitation), Paramagnetic resonance, Electrons, Absorption spectrum, Phosphorescence, Organic compounds.

AD-433 587 Div. 25
OTS price $2.60

Rensselaer Polytechnic Inst., Troy, N. Y.
PROBABLE INTERFACE TEMPERATURES OF SOLIDS IN SLIDING CONTACT.
Rept. for 1 May-31 Aug 63,
by F. F. Ling and S. L. Pu. Feb 64, 29p.
Contract AF33 657 10058, Proj. 7342, Task 734204
RTD TDR63 4184 Unclassified report

Report on Fundamental Research on Macromolecular Materials and Lubrication Phenomena.

Descriptors: (*Surface temperatures, Distribution), Mathematical analysis, Friction, Solids, Thermodynamics, Integral equations, Mathematical models, Differential equations.

Typical time dependent, surface temperature distribution obtained by indirect measurement is presented. Also presented are area averaged temperature jump data at the interface for high Peclet number; the jump is associated with macroscopic thermal resistance mechanism across the interface. Moreover, a simple stochastic model is introduced to show that, whereas the measurable temperature far away from the interface may be smooth functions with respect to distance from the interface, the surface temperature always will be fluctuating and the magnitude of these temperature flashes are shown. (Author)

AD-433 598 Div. 25
OTS price $1.10

Air Force Cambridge Research Labs., Bedford, Mass.
DIRECT RECORDING OF INTEGRATED BAND INTENSITIES FROM A LINEAR WAVELENGTH SPECTROMETER,
by B. Schurin, D. E. Williamson and S. A. Clough
Oct 63, 7p.
Proj. 8603
AFCRL 63 749 Unclassified report

Reprint from Applied Optics, 2, pp. 611-615, June 63. (Copies also available from DDC)

Descriptors: (*Spectrum analyzers, Recording systems), (*Infrared equipment, Spectrum analyzers), Intensity, Band spectrum, Instrumentation, Potentiometers, Integrators, Servomotors, Circuits, Optical instruments.

AD-433 640 Div. 25
OTS price $8.10

Thomas J. Watson Research Center, Yorktown Heights, N. Y.
LOW TEMPERATURE VAPOR GROWTH STUDIES,
by A. Reisman. 31 Dec 63, 83p. Rept. no. SR2
Contract AF19 628 2468, Proj. 4608, Task 460804
AFCRL 64 63 Unclassified report

Descriptors: (*Vapor plating, Low-temperature research), Germanium compounds, Iidine compounds, Transport properties, Hydrogen compounds, Helium, Single crystals, Crystal structure, Electrons, Hall effect, Etched crystals, Spectroscopy.

With the completion of analyses of several germanium-iodine thermodynamic interactions and construction of a transport system based on the potential exhibited by the results for the germanium-hydrogen-iodine-helium equilibrium, studies of low temperature growth in the range 300-360 deg. were initiated. The main focus has thus far pertained to the pronounced orientation effects exhibited by single crystal deposits grown on single crystal substrates purposely misoriented in several crystallographic directions. During the pase period, automatic Bourdon Gauge studies were initiated on both the equilibrium and kinetic aspects of the Ge-Cl system. Studies of the effects of u. v. stimulated etching reactions have been started and indicate approximately a 64% enhancement of stimulated over non-stimulated etching rate when germanium chloride is carried past Ge single crystals in a He atmosphere. (Author)

AD-433 671 Div. 25
OTS price $7.60

General Electric Co., Syracuse, N. Y.
IMPROVED PHOTOCONDUCTORS FOR DISPLAY SWITCHING.
Final rept.,
by S. Ing. Feb 64, 76p.
Contract AF30 602 2918, Proj. 5578, Task 557803
RADC TDR63 554 Unclassified report

Descriptors: (*Photoelectric cells (Semiconductor), Display systems), (*Semiconductors, Photoconductivity), Electroluminescence, Semiconductor devices, Single crystals, Cadmium compounds, Sulfides, Selenides.

Research and development work on polycrystalline CdSe photoconductors for (eventual) switching of large electroluminescent displays is described. A powder sintering procedure, followed by either a spray or a settling technique for depositing the powder onto the substrate, was used to fabricate the photoconductor cells. The settling technique was found to be more reproducible, easier to control and less costly than the spray method. Various pertinent processing variables were studied including the amount of dopant and fluxing agent added, the sintering temperature and time, the concentration of oxygen in the sintering ambient and the particle size. A number of measurements were made in order to fully characterize the photoconductors, clarify the role of various processing variables and understand the many aspects of the photoconductive processes. (Author)

AD-433 680 Div. 25
OTS price $5.60

ITT Research Inst., Chicago, Ill.
INVESTIGATION OF NARROW LINE PARAMAGNETIC RESONANCE ABSORPTION SPECTRUM IN SINGLE CRYSTAL CALCITE,
Final rept., 27 Dec 62-27 Dec 63,
by S. A. Marshall. Mar 64, 55p.
Contract AF30 602 2912, Proj. 8503, Task 850302
RADC TDR64 34 Unclassified report

Descriptors: (*Paramagnetic resonance, Absorption spectrum), (*Calcite, Single crystals), Solid state physics, Iron, Isotopes, Hyperfine structure, Manganese, Ions, Carbon, Magnetic fileds, Crystal structure, Symmetry (Crystallography).

Results of a program of study on the narrow line paramagnetic resonance absorptions in single crystals of calcite are presented. These include an analysis carried out on the spectrum of the trivalent iron isotopes, Fe54, Fe56, and Fe57 in calcite and the spectral shifts associated with these isotopes, an analysis of the spectrum of the molecular ion CO2 and finally the superhyperfine structure in the divalent manganese ion spectrum due to the magnetic interaction of the C13 isotope with the manganese ion. (Author)

AD-433 718 Div. 25
OTS price $2.60

Coordinated Science Lab., U. of Illinois, Urbana.
SUPERCONDUCTIVITY,
by C. B. Satterthwaite. Sep 63, 23p. Rept. no. R181
Contract DA36 039AMC02208E, Proj. 3A99 25 004
Unclassified report

Descriptors: (*Superconductivity, Scientific research), Electrons, Crystal lattices, Theory, Metals, Electric currents, Resistance (Electrical), Magnetic fields, Temperature, Liquefied gases, Helium, Cryostats.

AD-433 724 Div. 25
OTS price $5.60

Naval Ordnance Test Station, China Lake, Calif.
A SOLUTION OF THE COMPLEX DIELECTRIC EQUATIONS FOR ROCKET EXHAUST MICROWAVE INTERFEROMETRY,
by Leroy J. Krzycki and Charles H. Turner.
Jan 64, 60p.
NOTS TP 3332; NAVWEPS 8407
Unclassified report

Descriptors: (*Magnetohydrodynamics, Equations), (*Electromagnetic waves, Electric fields), (*Interferometers, Microwave frequency), Tables, Motion, Damping, Propagation, Electron density, Electron beams, Digital computers, Attenuation, Exhaust gases.

The complex dielectric equations describing the interaction of an electromagnetic wave with an ionized medium are derived from a basic consideration of electromagnetic wave propagation and the motion of a free electron in a polarized electric field. The equations consider a plane, transverse vave propagating into a dielectric medium of arbitrary, but uniform, density. The effect of electron collision damping is considered. Interface losses are discussed. Graphs and tables, obtained with digital computation, indicate the variation of attenuation and phase shift per unit path length with the applied microwave frequency for various electron densities. (Author)

AD-433 749 Div. 25
OTS price $1.60

Navy Underwater Sound Lab., Fort Trumbull, New London, Conn.
COMPARISON OF THEORETICAL AND EXPERIMENTAL VALUES OF SPATIAL CORRELATION,
by Benjamin F. Cron, Beverly C. Hassell and Frank J. Keltonic. 16 Dec 63, 18p.
Proj. SS050 000 1562
USL 596 Unclassified report

Descriptors: (*Noise, Analysis), (*Oceans, Surfaces), (*Underwater sound, Hydrophones), Magnetic tape, Recording systems, Hydrophones, Spectrum analyzers, Correlation techniques, Measurement, Theory, Experimental data, Bandpass filters, Underwater sound signals, Sound signals.

Experimental measurements of spatial correlation were made using the top 12 elements of a 40-element vertical array. The hydrophone outputs were pased through filters in the 200-400 cps, 400-600 cps, 600-800cps, and 800-1000 cps bands. Selected pairs of hydrophones were cross-correlated. The experimental values of spatial correlation were compared with the theoretical values of spartial correlation. A good agreement of the experimental results with the theoretical results is obtained in the higher pass bands. In general, the agreement is better for higher frequency bands and higher sea states. The results indicate that (1) the noise is predominantly from the horizontal direction in the 200-400 cps band, (2) the noise is predominatly from the vertical direction in the other measured bands, and (3) the sources on the surface of the ocean radiate energy similar to that of a dipole source. (Author)

AD-433 752 Div. 25
OTS price $3.60

Polytechnic Inst. of Brooklyn, N.Y.
AXISYMMETRIC, PLANE-STRAIN DYNAMIC RESPONSE OF A THICK, ORTHOTROPIC, VISCOELASTIC SHELL,
by Jerome M. Klosner and Clive L. Dym. Feb 64, 36p. Rept. no. PIBAL682
Contract Nonr839 32, Proj. NR064 457
Unclassified report

Descriptors: (*Plastic shells, Viscoelasticity), Numerical analysis, Cylindrical bodies,

Theory, Taylor's series, Bessel functions, Deformation, Stresses, Simultaneous equations, Motion, Determinants.

The plane-strain, axisymmetric, thickness-stretch modes of a thick, orthotropic, viscoelastic shell embedded in a thin elastic casing are investigated. The steady-state dynamic response of the orthotropic, viscoelastic shell is obtained and compared with the response of the elastic shell. A higher-order shell theory is developed and its accuracy for the lower modes is demonstrated. Finally, the effect of orthotropy on the rapidity of the transition from the free vibrations of a plate to that of a solid elastic circular cylinder in investigated. (Author)

AD-433 800 Div. 25
OTS price $1.60

Army Cold Regions Research and Engineering Lab., Hanover, N. H.
SHEAR STRESS MEASUREMENTS IN SITU OF SOILS SUBJECTED TO VIBRATORY LOADS,
by Rudolph K. Bernhard. Nov 63, 16p.
Proj. 8S66 02 001
CRREL TR90 Unclassified report

Descriptors: (*Soil mechanics); (*Soils, Vibration), (*Vibration, Measurement), (*Shear stresses, Measurement), Loading (Mechanics), Calibration, Statics, Dynamics, Distribution, Analysis, Experimental data.

Direct measurements of shear and normal stresses were made, the compatibility of the resulting shear stress distribution and the corresponding normal stress pattern was studied, and the experimental findings were correlated with the existing theories for biaxial systems. A miniaturized shear cell was employed and the results of measurements in situ with this shear cell are compared with those of pressure cells. Vibratory (sinusoidal) loads were generated by a mechanical oscillator on the soil surface and transmitted to both types of cells buried beneath the oscillator. A predominantly homogeneous and noncohesive soil (dry beach sand) was used, so that the theory for biaxial stress distribution could be applied as a first approximation in the analysis. The standard deviation of the experimentally obtained shear stress vectors from values computed for a biaxial system did not exceed 4.75%, and for normal stresses it did not exceed 5.22%. (Author)

AD-433 810 Div. 25
OTS price $1.60

Ultrasonics Lab., Michigan State Univ., East Lansing.
FORTRAN PROGRAM FOR ENERGY RATIOS OF REFLECTED AND REFRACTED WAVES AT FLAT BOUNDARIES.
by Walter G. Mayer. Apr 64, 13p. TR9
Contract Nonr2587 01, Proj. NR384 304
Unclassified report

Rept. no The Propagation of High Amplitude Sound Waves.

Descriptors: (*Sound transmission, Programming (Computers)), Ultrasonic properties, Ultrasonic radiation, Boundary value problems, Energy, Sound signals.

The equations for the energy ratios of reflected and refracted to incident longitudinal ultrasonic waves are programmed for FORTRAN. The ratios are determined as a function of angle of incidence for liquid-solid, solid-liquid, solid-vacuum or solid-solid flat interfaces. No assumptions are required concerning densities and relative magnitudes of the various wave velocities. Energy ratios are also calculated for critical angles, if they exist. The entire program and comments are given. (Author)

AD-433 828 Div. 25
OTS price $8.10

General Dynamics, Pomona, Calif.
VACUUM EVAPORATED AND CATHODIC SPUTTERED THIN FILMS,
by E. Krikorian, R. J. Sneed, P. Chen and B. Berson. Mar 64, 82p.
Contract AF33 657 8728, Proj. 4150, Task 415003
RTD TDR63 4264 Unclassified report

Descriptors: (*Thin films, Epitaxial growth), (*Epitaxial growth, Thin films), Single crystals, Vacuum, Evaporation, Germanium, Gold, Gases, Pressure, Instrumentation, Mica, Hall effect, Diffraction analysis, Transition temperature, Semiconductors.

The effects of formation conditions on the epitaxial growth of thin films deposited by cathodic sputtering and vacuum evaporation are reported. The primary condition parameters considered are substrate temperature and rate of deposition. Trends have also been established for the effect of thickness, annealing and residual gas pressure. The results of a detailed investigation of Ge sputtered onto single crystal Ge, both (111) and (100), and (111) CaF2, are presented. Less detailed, but consistent results were obtained for identical film-substrate systems obtained by vacuum deposition. Data are also included for Ge deposited on single crystal Si, mica, amorphous quartz and glass. Other film-substrate systems considered include gold on rock salt and glass, silver on rock salt, and Si on Si. (Author)

AD-433 834 Div. 25
OTS price $1.10

Frick Chemical Lab., Princeton U., N. J.
THE MICROCANONICAL ENSEMBLE,
by Arthur V. Tobolsky. Feb 64, 8p. Rept. no. TR RLT70
Contract Nonr1858 07, Proj. NR356 377
Unclassified report

Descriptors: (*Statistical mechanics, Quantum mechanics), (*Gases, Thermodynamics), Particles, Combinatorial analysis, Crystals, Atoms, Entropy, Temperature.

In the usual development of quantum statistical mechanics the microcanonical ensemble is introduced to present the basic postulates of this subject with utmost clarity. However practical calculations of elementary problems using the microcanonical ensemble directly are seldom carried out. Either the method of the most probable distribution is introduced, or the canonical ensemble is introduced. Both methods require the development of further mathematical and physical concepts. Elementary methods can be used to develop the thermodynamic properties of monatomic crystals and the corrected Boltzmann monatomic gas directly from the basic concepts of the microcanonical ensemble. (Author)

AD-433 849 Div. 25
OTS price $4.60

Stanford Research Inst., Menlo Park, Calif.
BARKHAUSEN EFFECT IN IRRADIATED PURE IRON AND NICKEL.
Final rept.
by S. I. Taimuty and J. B. Swedlund. 28 Feb 64, 44p.
Contract Nonr361500, Proj. PHU3871
Unclassified report

Descriptors: (*Nickel, Magnetic properties), (*Iron, Magnetic properties), (*Magnetic materials, Radiation damage), Crystal lattice defects, Electron beams, Neutron beams, Heat treatment, Hysteresis, Impurities, Instrumentation.

The effect of electron and neutron irradiation on the Barkhausen effect and coercive force of pure iron and nickel were investigated. The investigation was designed to establish whether (1) the Barkhausen effect can provide a sensitive indication of the presence of large radiation-induced defect clusters and whether (2) study of the Barkhausen effect could provide meaningful information about behavior of such defects. (These aims were based on the hypothesis that the Barkhausen effect arises from impedance of domain wall motion by defects having dimensions comparable to the domain wall thickness.) Results indicate that the Barkhausen effect is a more sensitive indicator of radiation damage in magnetic materials than is the coercive force. However, the smallness of the effect after neutron irradiation is puzzling. Based on estimates of the number of high-energy primary recoils produced by neutrons, the observed changes were several orders of magnitude too small. This result may indicate that the concentration of defects generated in the path of high-energy primary recoils is too small to impede domain wall motion appreciably. (Author)

AD-433 862 Div. 25, 27
OTS price $1.60

Illinois U., Urbana.
SCATTERING OF ELECTRONS AND IONS BY DUST PARTICLES IN A GAS,
by R. C. Dimick and S. L. Soo. Mar 64, 14p.
Rept. no. TR ILL14P
Proj. NR098 038
Unclassified report

In cooperation with Virginia Univ., Charlottesville, Va., Contract Nonr362300.

Descriptors: (*Gas ionization, Dust), Electron density, Ions, Charged particles, Ionization, Kinetic theory, Scattering.

Interaction of a partially ionized gas with dust particles was studied. Results show modification of an earlier approximation by Rosen with consistent degree of approximation. (Author)

AD-433 873 Div. 25
OTS price $1.60

Melabs, Palo Alto, Calif.
INVESTIGATION OF MICROWAVE NON-LINEAR EFFECTS UTILIZING FERROMAGNETIC MATERIALS,
Quarterly progress rept. no. 7, 17 Aug-16 Nov 63,
by Lee F. Donaghey. 16 Nov 63, 20p.
Contract DA36 039sc89206, Task IG6 22001A055 05
Unclassified report

Descriptors: (*Ferromagnetic materials, Magnetic fields), Microwaves, Ferrites, Garnet, Equations, Operators (Mathematics), Parametric amplifiers, Microwave equipment, Millimeter waves, Electromagnetic properties, Calibration, Design.

The general solution is given for the equation of motion for the magnetization of a ferrite sample under parallel pumping, and orthogonal cavity detuning and signal magnetic field orientation. Normal mode solutions are obtained when the driving fields are assumed to be circularly polarized. A zeroth order solution is developed when the detuning fields are included in the effective r-f driving field. An experimental cavity for which the above analysis applies was developed to allow loop coupling to a ferrite disc. Pump stabilization and magnetic bias field strength calibration are discussed. (Author)

AD-433 894 Div. 25
OTS price $4.60

HP Associates, Palo Alto, Calif.
INVESTIGATION OF HOT ELECTTON EMITTER.
Scientific rept. no. 6, 1 Sep-31 Dec 63.
31 Dec 63, 43p.
Contract AF19 628 1637, Proj. 4608, Task 460805
AFCRL 64 134 Unclassified report

Descriptors: (*Electrons, Heat), (*Emissivity, Electrons), Cadmium compounds, Sulfides, Resistance (Electrical), Evaporation, Gold, Platinum, Vacuum apparatus, Selenides, Metal films, Silicon, Measurements, Heat treatment, Photoelectric effect.

A summary of the work on CdS is presented, and it is concluded that resistivity of the evaporated films does not depend on the controlled evaporation parameters. It is observed that gold substrates are destroyed by the evaporation of CdS onto a 300 C substrate whereas platinum substrates are not. The evaporation of CdS has been dropped in favor of CdSe which appears to be a more reproducible system. The range of 0.95 eV hot electrons in gold films has been photoelectrically determined to be 330 ± 30 angstrom units. This value is obtained with gold films on chemically prepared silicon as well as samples cleaved in an evaporating gold stream. A discussion of the range measurements is presented, and this value of range is compared to that measured by other investigators. (Author)

AD-433 958 Div. 25
OTS price $5.60

Arnold Engineering Development Center, Arnold Air Force Station, Tenn.
CHARTS OF NORMAL SHOCK WAVE PROPERTIES IN IMPERFECT AIR,
by Clark H. Lewis and E. G. Burgess, III.
Mar 64, 54p.
Contract AF40 600 1000
AEDC TDR64 43 Unclassified report

Descriptors: (*Shock waves, Air), (*Gases, Dynamics), Gas ionization, Equations of state, Tables, Pressure, Thermodynamics, Dissociation, Temperature.

Gas-dynamic properties which include the effects of dissociation, ionization, and intermolecular forces (van der Walls) are presented for incident and reflected shock waves in equilibrium imperfect air. Charts are presented for incident shock Mach numbers in the range from 6 to 30 into (ideal) air at a temperature of 300 K and pressures in the range from 10 to the minus 4 power to 10 to the 3rd power cm Hg. The temperature and density in any region do not exceed, respectively, 15,000 K and 158 amagats. In addition to the usual incident and reflected shock properties, stagnation conditions upstream and downstream and conditions immediately downstream of a standing shock wave are also presented. At pressures above one atmosphere in the undisturbed gas, the effects of the intermolecular forces on the gas-dynamic properties are demonstrated. (Author)

AD-433 961 Div. 25
OTS price $7.60

Watkins-Johnson Co., Palo Alto, Calif.
GASEOUS OPTICAL MASERS.
Rept. for May 62-Nov 63,
by S. E. Sobottka and V. Met. Dec 63, 75p.
Contract AF33 657 8986, Proj. 4156, Task 415608
AL TDR64 37 Unclassified report

Descriptors: (*Lasers, Gases), Helium, Neon, Gas discharges, Power, Theory, Discharge tubes, Measurement, Spectrophotometers, Electron density, Excitation, Atomic energy levels, Paramagnetic resonance.

Studies were made of basic processes operating in He-Ne lasers with emphasis on acquiring information related to techniques for increasing the output powers. It was found that the population of the upper maser level for the 6328A and 1.15 micron transitions saturates with increasing electron density or energy as is predicted for excitation by resonance transfer from He metastables. The population of the lower maser level for the 6328A transition does not saturate so that the laser output power, as a function of electron density, increases to a maximum and then decreases to zero. Excitation to the lower maser level or to any level directly excitated by electron collisions is much more effective with pulsed currents (having large average electron energies) than for dc currents. (Author)

AD-433 999 Div. 25
OTS price $1.60

Naval Ordnance Test Station, China Lake, Calif.
COUPLING OF PRESSURE OSCILLATIONS WITH ELECTROMAGNETIC FIELDS IN LARGE ROCKET MOTORS,
by H. S. Green. Mar 64, 15p.
NOTS TR3225, NAVWEPS 8133
Unclassified report

Descriptors: (*Exhaust gases, Magnetic fields), (*Electromagnetic fields, Exhaust gases), Rocket motors, Plasma oscillations, Gas ionization, Pressure, Plasma physics, Electrons, Oscillation, Resonance.

The effects of ionization in hot gases produced in rocket motors showed that under certain conditions diffusion of electrons will produce a small current. This current will, in turn, produce a characteristic magnetic field observable from outside the plasma. It is also shown that under certain conditions an external electromagnetic field will produce pressure oscillations in the plasma which are independent of the natural oscillations of the plasma, and which are quickly damped by viscosity and turbulence. (Author)

AD-434 001 Div. 25
OTS price $3.60

Martin Marietta Corp., Orlando, Fla.
EXCITATION AND DETECTION TECHNIQUES FOR MILLIMETER WAVE TRANSITIONS.
Quarterly progress rept. no. 6, 1 Oct 63-1 Jan 64,
by J. J. Gallagher, R. G. Strauch and R. E. Cupp.
Mar 64, 37p. Rept. no. OR 3821
Contract DA36 039SC90753, Proj. 3A 99 15 011
Unclassified report

Descriptors: (*Millimeter waves, Detection), Excitation, Molecular beams, Spectroscopy, Oscillators, Instrumentation, Ammonium compounds, Electron bombardment, Molecular spectroscopy, Frequency, Standards, Signals, Resonance.

During the past quarter, the electron bombardment ionizer has been improved to the extent that it has been possible to observe an RF electric resonance in hydrogen sulfide. Testing of oscillators against the ammonia maser is continuing. Work on the small molecular beam system is reported, and the status of millimeter spectroscopy investigations is discussed. (Author)

AD-434 028 Div. 25, 2
OTS price $3.60

Boeing Scientific Research Labs., Seattle, Wash.
RETARDING POTENTIAL MEASUREMENTS OF ELECTRONS PHOTOEMITTED BY N2, CO, and O2,
by Richard I. Schoen. Nov 63, 33p. Document no. D1 82 0315, FSL83
Unclassified report

Also available from the author.

Descriptors: (*Gas ionization, Ultraviolet radiation), Electron transistions, Photoelectrons, Nitrogen, Oxygen, Carbon compounds, Monoxides, Molecular spectroscopy, Ionization potentials, Upper atmosphere, Photoelectric effect, Excitation.

Retarding potential measurements have been made on electrons emitted during the photoionization of N2, O2 and CO. More than half of the ions produced by radiation in the 700 to 500 angstroms interval were observed to be in states of electronic excitation. Vibrational excitation of the ground states of CO(+) and O2(+) occurred in the wavelength intervals between the first and second ionization potentials. Part of the excitation of vibrational states was attributed to autoionization phenomena. (Author)

AD-434 045 Div. 25
OTS price $12.00

Laboratory for Electronics Inc., Boston, Mass.
RESEARCH IN FERROMAGNETICS.
Scientific rept. no. 2, 15 Dec 61-15 Dec 62
15 Dec 62, 168p. SR 979A2
Contract AF19 604 8349, Proj. 5632, Task 563207
AFCRL 64 20 Unclassified report

Descriptors: (*Ferromagnetic materials, Scientific research), Glass, Aluminum coatings, Measurement, Anisotropy, Temperature, Surfaces, Computer logic, Etched crystals, Heating elements, Materials, Cleaning, Polishes, Evaporation.

AD-434 052 Div. 25
OTS price $2.60

Institute for Defense Analyses, Washington, D. C.
INTERMITTENT HEAT CONDUCTION INTO A METAL SLAB, PART I, ANALYSIS. PART II, NUMERICAL CALCULATION,
by K. W. Mcvoy and R. G. Finke. Dec 62, 24p.
Rept. no. TN62 70
Contract SD50
Unclassified report

Descriptors: (*Metals, Heat transfer), (*Heat transfer, Metals), Mathematical models, Heat, Absorption (Physical), Boiling, Pressure, Analysis, Gases, Temperature, Thermal conductivity, Functions.

The Bethe-Dyson model for the absorption of heat by a bare metallic slab is examined without considering the mathematical approximations of Bethe and Dyson. Although a machine computation may be necessary for certainty, we find no reason to doubt their conclusion that a relatively small number of heat impulses will melt the slab; in fact, they probably underestimated the heat absorbed, since they did not allow for the increase in the boiling point of the slab due to the high pressure it experiences. (Author)

AD-434 055 Div. 25, 9
OTS price $2.60

AVCO Everett Research Lab., Everett, Mass.
DETAILED THEORETICAL AND EXPERIMENTAL STUDY ON A LARGE MHD GENERATOR,
by J. F. Louis, G. Gal and P. R. Blackburn.
Mar 64, 27p. Research rept. no. 174
Unclassified report

Descriptors: (*Magnetohydrodynamics, Generators), Power, Heat transfer coefficients, Hall effects, Thermal conductivity, Boundary layer, Electrodes, Electric fields, Supersonic flow, Aerodynamic characteristics, Performance (Engineering), Shock (Mechanics), Pressure.

Results of experiments carried out in a large MHD generator have been previously reported. Further results are described which led to a good understanding of MHD phenomena over a wide range of operating conditions and the detailed agreement between theory and experiment is examined. The good agreement indicates the feasibility of predicting MHD generator performance in detail. By a systematic study of the numerous data obtained, the magnitude of the different losses was determined with precision and the generator performance calculated over the wide range of running conditions. The theory used to describe the performance is one-dimensional, the friction and heat transfer coefficients have been determined experimentally. The use of this theory allowed the detailed calculation and agreement with experiment for more than twenty runs using as the only parameters the varying inlet and loading condition. Determination of shock location, effect of the boundary layer separation and electrode losses due to the Hall field are introduced in these calculations and the influence of these different effects is shown in detail. (Author)

AD-434 085 Div. 25
OTS price $1.60

Army Cold Regions Research and Engineering Lab., Hanover, N. H.
METHOD OF DETERMINING DYNAMIC PROPERTIES OF VISCO-ELASTIC SOLIDS EMPLOYING FORCED VIBRATION,
by Tung-Ming Lee. Nov 63, 16p.
Proj. 8S66 02 001 01
CRREL RR122 Unclassified report

Descriptors: (*Solids, Mechanical properties), Vibration, Viscoelasticity, Stresses.

The dynamic properties of visco-elastic solids are evaluated by using the forced longitudinal and torsional vibration techniques. A method of eliminating experimental difficulties due mainly to the coupling of sample with supporting system is introduced in using the maximum amplitude ratio of the free end of a sample to the end attached to a driver and the corresponding vibration frequency as a criterion. Experimental measurements of these values are sufficient to determine the dynamic properties of samples. The complex modulus is used to describe the stress-strain relationship for a visco-elastic solid. In the method presented for alloting the auiplitude ratio and vibration frequency, matchin of natural frequencies of the sample and the driver is not necessary and the same driving unit may be used throughout the experiment. The expressions derived for longitudinal and torsional vibrations bear direct relationship between the measured items and the dynamic properties and are simple to use. (Author)

AD-434 094 Div. 25
OTS price $2.60

General Telephone and Electronics Labs. Inc., Bayside, N. Y.
STUDY OF ADSORPTION OF GASES ON SOLIDS IN THE HIGH VACUUM RANGE,
by C. M. Bliven and J. V. Florio. 31 Jan 64, 22p.
SR 6; TR64 255 6
Contract AF19 628 331, Proj. 5634, Task 563405
AFCRL 64 113 Unclassified report

Descriptors: (*Gases, Adsorption), (*Solids, Vacuum apparatus), Measurement, Work functions, Thermionic emission, Nitrogen, Tungsten, Oxygen, Molybdenum, Cathodes, Filaments.

Adsorption data have been obtained for the tungsten-nitorgen system for a second filament. The lowest surface coverage detectable for which the filament is in quasi-equilibrium with its surrounding is 0.55 of a monolayer. In the study of oxygen adsorption on molybdenum, the carbon monoxide background, resulting from reactions between the incoming oxygen and carbon impurities in the omegatron filament, molybdenum anode, and oxide cathode assembly, has been substantially reduced. The major source of carbon monoxide during oxygen adsorption on the molybdenum anode is replacement of previously adsorbed carbon monoxide by oxygen. Some results on sticking probability and molybdenum work function changes with oxygen coverage are presented. (Author)

AD-434 097 Div. 25
OTS price $3.60

AeroChem Research Labs. Inc., Princeton, N. J.
THE EFFECTS OF MAGNETIC FIELDS ON A FLOWING PLASMA.
Final rept. June 59-Nov 62,
by S. A. Gordon. Jan 63, 32p. Rept. no. TP56
Contract AF33 616 6717, Proj. 7063, Task 70138
Unclassified report

Descriptors: (*Heat transfer, Measurement), (*Plasma medium, Magnetic fields), Gases, Glow discharges, Gas flow, Generators, Probes (Electromagnetic), Stagnation point, Electrical conductance, Air, Argon, Nitrogen, Helium, Magnetohydrodynamics.

An overall review is made of the work undertaken to measure heat transfer rates in a flowing plasma. It is pointed out that the lack of reliable measurement techniques (in itself due to the immature state of plasma research) has impeded progress. The current status of these investigations is that a measurable decrease in heat transfer to the stagnation point has been obtained. Afurther anomalous dependence of the size of the reduction on magnetic field direction has not yet been fully settled. (Author)

AD-434 127 Div. 25
OTS price $3.60

Electronic Defense Lab., Mountain View, Calif.
RESEARCH ON TECHNIQUES FOR LIGHT MODULATION DETECTION.
Interim engineering rept. no. 7, 1 Dec 63-1 Mar 64,
by E. O. Ammann. 20 Mar 64, 32p. Technical memo. no. M670
Contract AF33 657 8995
Unclassified report

Descriptors: (*Crystal detectors, Optical equipment), (*Light, Modulation), Crystal filters, Polarization, Discriminators, Refractive index, Polynomials, Detection, Noise, Microwave equipment, Microwave frequency, Calcite, Prisms (Optics).

This report covers the seventh quarter of an applied research program conducted by the Sylvania Microwave Device Division to establish techiques for light modulation detection. New results are described in the following two areas: (1) In IER No. 6, two synthesis techniques (termed I and II) for realizing an arbitrary optical transfer function were described. Synthesis procedure no. I yields a filter containing n birefringent crystals, n bias units, and n + 1 polarizers, while synthesis procedure no. II gives a filter containing n birefringent crystals and two polarizers. IER No. 7 describes an important improvement in synthesis procedure no. I which allows us to maximize the filter output. (2) A proposed technique is presented for modifying the birefringent discrimnator so that it can accommodate light of an arbitrary polarization. (Author)

AD-434 151 Div. 25, 15
OTS price $6.10

Harvard Coll., Cambridge Mass. Observatory.
GENERALIZED TABLES FOR THE CALCULATION OF DIPOLE TRANSITION PROBABILITIES IN LS - COUPLING,
by Bruce W. Shore and Donald H. Menzel. Feb 64, 62p. Scientific rept. 29
Contract AF19 604 4962, Proj. 7649, Task 764901
AFCRL 64 37 Unclassified report

Descriptors: (*Electron transitions, Probability), (*Tables, Atomic orbitals), Operators (Mathematics), Quantum mechanics, Harmonic oscillators.

Calculation of transition probabilities or oscillator strengths for allowed transitions proceeds in two steps: calculation of the dipole-moment matrix in a simple coupling scheme (usually LS-coupling) followed by transformation of this matrix to the energy scheme. Though the oscillator strength for and transition is proportional to the square of a matrix element, the transformation step requires absolute values, including signs (±). Existing tables of line and multiplet strengths omit these signs, and hence are useful only when the atomic states are nearly LS-coupling states - ofter a poor approximation. (Author)

AD-434 155 Div. 25, 15
OTS price $6.60

Frick Chemical Lab., Princeton Univ., N. J.
THE FREQUENCY CHECK, AN EXTENSION OF THE VECTOR VERIFICATION METHOD,
by B. T. Gorres and R. A. Jacobson. 22 Nov 63, 70p. Technical rept. no. 7
Grant DA ARO D31 124G265, Proj. 3083C
AROD 3083 11 Unclassified report

Descriptors: (*Crystal structure, Symmetry (Crystallography), (*Conformal mapping, Vector analysis), Electron density, Programming (Computers), Computers, Atomic properties, Frequency, Atoms.

The frequency check, utilizing three-dimensional superpositions of the Patterson and vector verification maps, assigns relative values to positions in electron-density space which are consistent with both the Patterson function and the space group symmetry of the crystal system. These relative values--which represent the extent of peak coincidence between a Patterson and electron density function--facilitate the choice of the first tentative atom position, a decisive factor in the success of the first tentative atom position, a decisive factor in the success of the vector verification procedure. Employing a bivalued Patterson map, each three-dimensional superposition resulting in a relative value requires one to five seconds on a large solid state computer. Tentative vector calculations are also discussed. These procedures have been programmed on the Control Data Corporation 1604 computer in symbolic machine language. (Author)

AD-434 156 Div. 25, 30
OTS price $3.60

Frick Chemical Lab., Princeton Univ., N. J.
SINGLE CRYSTAL ORIENTER SETTINGS (CDC 1604),
by B. T. Gorres and R. A. Jacobson. Sep 63, 38p. Technical rept. no. 6
Grant DA ARO D31 124G265, Proj. 3083C
AROD 3083 10 Unclassified report

Descriptors: (*Single crystal, Measurement), (*Goniometers, Crystal structure), Symmetry (Crystallography), Refractometers, Diffraction analysis, Reflection, Programming (Computers), Computers.

AD-434 166 Div. 25
OTS price $1.60

United Aircraft Corp., East Hartford, Conn.
CONTROL OF LASER PERFORMANCE.
Quarterly status rept. no. 3, 26 Dec 63-25 Mar 64,
by G. E. Danielson, Jr. and A. J. DeMaria.
31 Mar 64, 18p. Rept. no. C920083 9
Contract DA19 020AMC0170A
Unclassified report

Descriptors: (*Lasers, Performance (Engineering)), Helium, Neon, Refractive index, Glass, Rods, Gases, Prisms (Optics), Refractive index, Ultrasonic radiation, Impurities, Neodymium, Transducers.

Investigations on a research program relating to the control of laser output are described. Studies of the effect on laser output control of varying the refractive index of a medium in a laser cavity are being carried out with ultrasonic, electric, or magnetic means. The following experimental results were obtained: 1. Initial tests of the glass prism light shutter were conducted with a visible He-Ne laser beam which was mechanically chopped at approximately 83 cps to facilitate modulation percentage measurements. Experimental results showed that approximately 80% modulation was obtained. 2. Gating of a 3 x 1/4 in. dia. Nd3+ doped glass laser rod with one megacycle transducers bonded to the ends produced an increase in peak and total output power. 3. Recent investigations of ultrasonic cell configurations have disclosed that an improved ultrasonic standing wave can be obtained with the use of one complete cylindrical transducer instead of two 180 degree focusing sections which were previously proposed. (Author)

AD-434 192 Div. 25, 10
OTS price $8.60

Columbia Univ., New York.
FORCED VIBRATIONS OF A VISCO-ELASTIC CYLINDER CASE-BONDED TO A THIN ELASTIC SHELL,
by L. A. Henry and A. M. Freudenthal. Jan 64, 91p. Technical rept. no. 22
Contract Nonr266 78, Proj. NR064 446
Unclassified report

Descriptors: (*Cylindrical bodies, Vibration), (*Structural shells, Vibration), Viscoelasticity, Elasticity, Solid rocket propellants, Propellant grains, Rocket cases, Bonded joints, Shear stresses, Motion, Equations, Theory,

Mathematical analysis, Functions, Stresses, Damping.

This paper is concerned with the forced vibrations of case-bonded solid propellant grains. Special attention is paid to the interaction between the thin elastic shell (case) and the thickwalled propellant cylinder. The effects of material damping in the propellant are explored. Frequency-response functions are computed, which can be used for analysis in situations where the loading is arbitrary deterministic or random (stationary). (Author)

AD-434 218 Div. 25, 16
OTS price $2.60

Naval Radiological Defense Lab., San Francisco, Calif.
THE SORPTION OF TRITIUM AND TRITIATED WATER VAPOR BY A FOAMED POLYVINYLCHLORIDE (ENSOLITE),
by S. Jacobs. 20 Jan 64, 25p.
Proj. SF011 05 11, Task 0543
NRLD TR717 Unclassified report

Descriptors: (*Tritium, Sorption), (*Water vapor, Tritiated compounds), Polyvinyl chloride, Radiation hazards, Plastic coatings, Surface properties.

The sorption and subsequent desorption of tritium and tritiated water vapor by foamed polyvinylchloride (Ensolite) was examined under a variety of experimental conditions. The elucidation of both the rates and total extent of the sorption and desorption under isothermal conditions was important. Ensolite sorbed both tritium and tritiated water vapor rapidly, achieving in most cases over 90% of the equilibrium value within 24 hr. The amount of tritium sorbed by Ensolite was proportional to the initial gas-phase tritium concentration. The tritium desorbed readily, forming a gas-phase concentration that increased with the amount of tritium initially sorbed by the Ensolite. Repetitive (cyclic) desorption of tritium from Ensolite and desorption in a flow system yielded results showing that tritium would continually desorb until the amount remaining in the system was negligible. The sorption of tritiated water vapor by Ensolite was much more rapid and extensive than the corresponding sorption of tritium. Analogous to tritium, tritiated water vapor desorbed into a flow system until a small amount of activity remained in the system. (Author)

AD-434 228 Div. 25
OTS price $2.60

Rensselaer Polytechnic Inst., Troy, N. Y.
GROWTH TWINNING IN CERAMIC SYSTEMS,
by R. C. DeVries and D. Jugle. Dec 63, 23p.
Contract Nonr59118
Unclassified report

Descriptors: (*Ceramic materials, Crystal growth), (*Barium compounds, Titanates), Crystal structure, Ferroelectric crystals, Microstructure, Symmetry (Crystallography), Crystal lattice defects, Microscopy, Etched crystals, Electrodes, Photomicrography.

AD-434 304 Div. 25
OTS price $1.60

California Inst. of Tech., Pasadena.
STRUCTURE OF LIQUIDS.
Final technical rept.
by C. J. Pings. 28 Feb 64, 17p. Rept. no. Ms 10, 071 R
Grant AF AFOSR 62 141
AFOSR 64 0581 Unclassified report

Descriptors: (*Liquids, Molecular structure), (*Molecular structure, Liquids), X-ray diffraction analysis, Liquid metals, Gallium, Supercooling, Liquefied gases, Argon, High-pressure research, Refractive index, Dielectric properties, Statistical mechanics, Cryogenics, Thermal expansion, Compressive properties, Hydrocarbons, Halogenated hydrocarbons, Polarization, Functions, Ultrasonic radiation, Absorption, Fluorine compounds.

Experimental studies have continued on the forces and configurations at the molecular level in simple liquids. Two different x-ray diffraction set-ups for the study of the diffraction pattern from liquid samples have been put into operation and have been used for extensive measurements on liquid gallium in the supercooled region and on liquid argon at pressures up to 80 atm near the critical state. Refractive index equipment has been used for measurements on liquid and solid argon, liquid methane, and liquid CF4. Ultrasonic apparatus has been used for an extensive mapping of absorption of sound near the consolute point in a binary liquid system. (Author)

AD-434 325 Div. 25
OTS price $1.10

Naval Research Lab., Washington, D. C.
A STUDY OF RADIATION INDUCED SHOCK WAVES EXTERNAL TO QUARTZ DISCHARGE TUBES AND ASSOCIATED FRACTURE PROBLEMS,
by R. C. Elton. 30 Mar 64, 11p.
NRL MR1509 Unclassified report

Descriptors: (*Shock waves, Measurement), (*Discharge tubes, Quartz), (*Shock tubes, Tests), Monochromatic light, Ultraviolet radiation, Calibration, Photoelectric materials, Detection, Electron density, Temperature, Fracture (Mechanics).

AD-434 343 Div. 25, 4
OTS price $2.60

Mallinckrodt Chemical Lab., Harvard U., Cambridge, Mass.
THE MICROWAVE SPECTRUM OF METHYL HYPOCHLORITE,
by John S. Rigden. 1963, 22p.
Unclassified report

In cooperation with National Research Council, Ottawa, Ontario, (Canada).

Descriptors: (*Microwave spectroscopy, Hypochlorites), Molecular structure, Quadrupole moments, Nuclear resonance, Hyperfine structure, Symmetry (Crystallography).

The microwave spectra of the normal species and some isotopically substituted species of methyl hypochlorite (CH3OCL) have been investigated in the frequency region 9,000-38,000 Mc. (Author)

AD-434 344 Div. 25, 4
OTS price $2.60

Harvard U., Cambridge, Mass.
THE MASS AND MICROWAVE SPECTRA, STRUCTURES AND DIPOLE MOMENTS OF THE ISOMERS OF SULFURMONOFLUORIDE,
by Robert L. Kuczkowski. 1964, 24p.
Unclassified report

Descriptors: (*Isomeric transitors, Microwave spectroscopy), (*Sulfur compounds, Fluorides), Dipole moments, Molecular structure, Molecular isomerism, Intensity, Measurement, Symmetry (Crystallography), Synthesis (Chemistry), Nuclear spins.

Division 25 - PHYSICS

AD-434 347 Div. 25, 4
OTS price $3.60

Mallinckrodt Chemical Lab., Harvard U., Cambridge, Mass.
THE MICROWAVE SPECTRUM OF PROPIONALDEHYDE,
by Samuel S. Butcher and E. Bright Wilson, Jr.
1963, 32p.
Unclassified report

Descriptors: (*Aldehydes, Microwave spectroscopy), Molecular structure, Chromatographic analysis, Isomeric transitions, Dipole moments, Harmonic oscillators, Vibration, Isotopes, Line spectrum, Perturbation theory, Molecular isomerision.

The microwave spectrum of propionaldehyde, was investigated in the frequency region 8-38 Gc. The existence of two stable rotamers has been demonstrated. The cis rotamer, in chich the four heavy atoms are coplanar, is more stable by 900 ± 100 cal/mole. An approximate treatment of the coupling of the -CH3 and C-C torsional motions in the cis rotamer is presented. Using this treatment the barrier to internal rotation in the cis rotamer is found to be 2280 ± cal/mole. The dihedral angle in the higher energy, gauche, rotamer is about 131 degrees. Evidence is given for coupling of the C-C torsional momentum and overall rotational angular momentum in the gauche rotamer. Other aspects of the spectrum are also discussed. (Author)

AD-434 358 Div. 25, 18
OTS price $2.60

Aerospace Corp., Los Angeles, Calif.
INFRARED - TODAY AND TOMORROW,
by Irving J. Spiro. 4 Mar 64, 26p. Rept. no. TDR269 4526 10 1
Contract AF04 695 269
SSD TDR63 238 Unclassified report

Descriptors: (*Infrared radiation, Energy), Theory, Weapon systems, Infrared windows, Optical materials, Photoconductivity, Attenuation, Luminescence, Bolometers, Thermocouples, Absorption, Attenuation, Infrared research, Infrared equipment.

The nature of infrared radiation and its transmission through the atmospheric constituents up to the entrance window of an optical system are described. The current state-of-the art of infrared technology, both civilian and military, is outlined, and some future improvements and developments are predicted on a basis of extrapolations of present equipment and component capabilities. (Author)

AD-434 368 Div. 25
OTS price $10.10

Arnold Engineering Development Center, Arnold Air Force Station, Tenn.
TABLES OF THERMODYNAMIC PROPERTIES OF ARGON FROM 100 TO 3000 K,
by Wanda J. Little. Apr 64, 129p.
Contract AF40 600 1000
AEDC TDR64 68 Unclassified report

Descriptors: (*Thermodynamics, Argon), (*Tables, Thermodynamics), (*Argon, Thermodynamics), Low-temperature research, High-temperature research, High-pressure research, Density, Compressive properties, Enthalpy, Entropy, Energy.

Tables of the thermodynamic properties of argon are presented for the temperature range of 100 to3000 K. In the first table, temperature and pressure are the independent variables with the pressure range extending from one to 5000 atm. In the second table, temperature and density are the independent variables with a density range extending from 10 to the -7th to 630 amagats. The additional tabulated properties are the compressibility factor Z and the dimensionless functions E/RT, H/RT, and S/R. The sources of data and the tables are discussed. (Author)

AD-434 372 Div. 25
OTS price $3.50

Northwestern U., Evanston, Ill.
INVESTIGATION OF THE SURFACE OPTICAL PROPERTIES OF OXIDES AS A FUNCTION OF COMPOSITION.
Rept. for Dec 58-June 63,
by R. Frerichs and D. H. Whitmore. Feb 64, 202p.
Contract AF33 616 6194, Proj. 7022, Task 73664
RTD TDR63 4196 Unclassified report

Surface and Interface Phenomena of Matter.

Descriptors: (*Thermodynamics, Oxides), (*Oxides, Semiconductors), (*Semiconductors, Thermoelectricity),Iron compounds, Manganese compounds, Niobium compounds, Titanium compounds, Electrolytic cells, Electrochemistry, Iron, Calcium compounds, Nickel, Nickel compounds, Electrodes, Laboratory furnaces, Pressure, Oxygen, Crystal lattice defects, X-ray diffraction analysis, Single crystals, Electrical conductance, Impurities, Ion bombardment, Optical properties, Germanium, Silicon, Cobalt compounds, Photoconductivity.

Two main areas of investigation were undertaken: (a) measurements of thermodynamic properties of some nonstoichiometric metal oxides and their mixtures with the aid of a high-temperature galvanic cell technique employing a solid electrolyte; (b) measurements of the thermoelectric power and electrical conductivity of several semiconducting metallic oxides and determination of the effect of doping by ion bombardment on these properties. The thermodynamic phase of the program resulted in an evaluation of the oxygen partial pressure-temperature relations in the case of the oxide mixtures studied and oxygen pressure-composition-temperature relations in the case of the nonstoichiometric oxides investigated. These latter data provide a means of distinguishing the predominant point defect present in the nonstoichiometric Nb2O5 and TiO2. (Author)

AD-434 378 Div. 25, 5, 6
OTS price $7.60

ITT Communication Systems Inc., Paramus, N. J.
APPLICABILITY OF LASER TECHNIQUES,
by W. S. Litchman. 13 Mar 64, 80p. Rept. no. 64TR379
Contract AF19 628 3358
ESD TDR64 249 Unclassified report

Descriptors: (*Lasers, Communication systems), Light transmission, Modulation, Detection, Light communication systems, Surface-to-surface, Surface-to-space, Space-to-space, Space-to-surface, Detectors, Magneto-optic effect, Modulators, Interferometers, Electro-optical photography, Propagation, Materials, Frequency, Optical equipment, Optical equipment components.

Laser communication techniques are presented that can be integrated into the AIRCOM System to satisfy unmet current and estimated future AF requirements. The advent of the laser has aroused great interest among communication engineers because it affords use of a new spectrum millions of megacycles wide. Although the laser will have a great impact in certain areas of communications technology, its potential in any specific area must be carefully evaluated. (Author)

AD-434 385 Div. 25
OTS price $1.10

Ohio State U. Research Foundation, Columbus.
MAGNETORESISTANCE EFFECT IN ADVANCE AND EVANOHM WIRES AT LOW TEMPERATURES IN FIELDS UP TO 50 KILOGAUSS,
by J. G. Daunt. Mar 64, 9p. Technical rept. 11
Contract Nonr49520, Proj. NR013 412; RF Proj. 989
Unclassified report

Descriptors: (*Resistance (Electrical), Magnetic fields), (*Low temperature research, Wire), Cryogenics, Materials, Nickel, Copper, Aluminum, Chronium, Temperature, Measurement.

AD-434 386 Div. 25
OTS price $1.10

Ohio State U. Research Foundation, Columbus.
RESISTANCE MINIMUM IN EVANOHM WIRE,
by J. G. Daunt. Mar 64, 5p. Technical rept. no. 12
Contract Nonr49520, Projs. NR018 412; RF 989
Unclassified report

Descriptors: (*Resistance (Electrical), Magnetic fields), Wire, Temperature, Measurement, Materials, Nickel, Copper, Aluminum, Chromium, Transition elements, Alloys.

In the course of measurements on the magnetoresistance effect in various commercial wires at low temperatures the electrical resistivity of Evanohm wire (75% Ni, 20% Cr, 2.5% Al, 2.5% Cu, supplied by Wilbur-Driver Company) in zero magnetic field was measured at temperatures down to 0.3 K. The data below 4.2 K are shown. It is evident that Evanohm passes through a resistance minimum. The temperature of the minimum can be estimated from previous data to be approximately 15 K to 20 K. The observed temperature coefficient of resistance at about 0.5 K is -0.003 K to the minum 1. Such resistance minima have been observed previously in other materials, particularly dilute alloys with transition elements and the example provided by Evanohm wire may be of further interest. In addition, the existence of the marked negative temperature coefficient of resistance below 1 K in Evanohm may be of value for thermometry. (Author)

AD-434 387 Div. 25
OTS price $1.60

Naval Ordnance Test Station, China Lake, Calif.
THERMODYNAMICS OF ORDER-DISORDER PHENOMENA.
Rept. for Dec 59-Feb 60
by H. S. Green. Mar 64, 15p.
NOTS; TP3222; NAVWEPS 8130
Unclassified report

Descriptors: (*Thermodynamics, Mathematical analysis), Statistical mechanics, Groups, Combinatorial analysis, Mathematical analysis, Crystals, Matrix algebra, Algebra, Ferromagnetic materials.

This report is a development of the paper dealing with the solution of the Association Problem (AP). The method of AP is applicable to a wide class of problems in statistical mechanics, concerning the thermodynamic equilibrium of homogeneous systems. These include crystalline solids, where there is naturally a lattice structure at the microscopic level, but also homogeneous fluids, which can be treated by the cell-cluster theory. The present report is particularly concerned with applications to the thermodynamics of order-disorder transitions, such as occur at the Curie point in ferromagnetic media. The purpose of the repost is to show how the matrix-spinor method can be applied to solve the two-dimensional Ising problem. It is impossible to present a complete reduction of the problem. In some places intuitive reasoning substitutes for mathematical rigor. (Author)

AD-434 391 Div. 25
OTS price $1.60

Feltman Research Labs. Picatinny Arsenal, Dover, N. J.
COLOR FROM THE METROLOGICAL STANDPOINT,
by Gerard Bertrand. Feb 64, 18p.
Unclassified report

Trans. from Bull. Soc. Franc. Ceram, Vol. 43, pp. 19-27, 1959.

Descriptors: (*Colorimetry, Spectrophotometers), (*Photoelectric cells (Semiconductors), Colorimetry), Colors, Optical analysis, Instrumentation, Measurement.

The principal types of instrument for measuring colors are defined in terms of the three trisimulus values X, Y, Z. They are: the spectrophotometer, the visual or photoelectric colorimeter, direct or differential measuring in struments and devices for comparing adjacent colors. All have three separate elements in common: light source, optical system and measuring device. Four criteria are defined for assessing the degree of accuracy of each type. It is shown that a choice must be made of a principle for measuring the modifying factor m and the type of apparatus to be used. This choice will be determined by the nature of the colorimetric problem involved. (Author)

AD-434 404 Div. 25
OTS price $1.00

Vanderbilt U., Nashville, Tenn.
EXPERIMENTAL INVESTIGATION OF A PROTOTYPE NOISE EXPOSURE METER,
by Robert W. Benson. Feb 64, 23p.
Contract AF33 616 8436, Proj. 7231, Task 723103
AMRL TDR64 4 Unclassified report

Report on Biomechanics of Aerospace Operations.

Descriptors: (*Exposure meters, Noise), (*Noise, Exposure meters), Design, Performance tests, Instrumentation, Circuits, Electrochemistry, Dosimeters.

This report describes an investigation of the performance of a prototype, personal noise exposure meter. The meter, utilizing electrochemical storage cells, provides a measure of total integrated noise energy to which its wearer is exposed during a day. The instrument performs within reasonable tolerances of those characteristics specified in the original design. Additional circuitry was installed to provide an indication of overload of the instrument. A record of the time history of the noise exposure is not provided by this type of instrument. Recommendations are made concerning the development of future noise dosimeters. (Author)

AD-434 417 Div. 25
OTS price $1.10

Rensselaer Polytechnic Inst., Troy, N. Y.
ANALYSIS OF THE DYNAMICS OF ELASTIC SYSTEMS.
Final rept., 1 Nov 62-31 Dec 63,
by George H. Handelman and William E. Boyce.
24 Jan 64, 5p.
Grant AF AFOSR182 63A
AFOSR 64 0144 Unclassified report

Descriptors: (*Mechanical waves, Research program administration), Dynamics, Diffraction, Propagation, Perturbation theory, Surfaces, Elastic shells, Probability, Bessel functions.

AD-434 493 Div. 25
OTS price $1.60

Naval Ordnance Test Station, China Lake, Calif.
REMOVAL OF DIVERGENCES IN QUANTUM ELECTRODYNAMICS.
Rept. for Dec 59-Feb 60,
by H. S. Green. Mar 64, 17p.
NOTS TP3223; NAVWEPS 8131
Unclassified report

Descriptors: (*Quantum mechanics, Dynamics), (*Dynamics, Quantum mechanics), Elementary particles, Functions, Electrons, Energy, Theory, Photons, Vacuum, Charged particles, Polarization, Perturbation theory, Bremsstrahlung, Equations.

An approach to the removal of divergences in quantum electrodynamics id developed which employs 'dressed' particles throughout in place of 'bare' particles. This is done through replacement of the familiar creation-annihilation operators by 'source functions.' The question of whether source functions can be found which supply suitable solutions to simple problems is studied. First a method for normalizing the Feynman amplitudes is proposed, and tested by consideration of the second-order electron self-energy. This quantity, logarithmically divergent on the usual theory, is found to converge for suitably chosen source functions. Next, the convergence of the charge renormalization constant for vacuum polarization is established for free photons. The requirements for a like result for virtual photons are indicated briefly. (Author)

AD-434 514 Div. 25
OTS price $1.10

Columbia Univ., New York.
HYDROMAGNETIC PLASMA RESEARCH.
Annual rept. no. 2, 1 Oct 62-63.
1 Oct 63, 5p.
Grant AF AFOSR48 63
AFOSR 64 0301 Unclassified report

Descriptors: (*Plasma physics, Scientific research), Gas ionization, Plasma sheath, Shock waves, Electromagnetic waves, Propagation, Magnetohydrodynamics, Shock tubes, Schlieren photography, Hydrogen, Transport properties, Nuclear propulsion, Neon, Electric discharges.

AD-434 549 Div. 25
OTS price $1.60

Redstone Scientific Information Center, Redstone Arsenal, Ala.
INSTANTANEOUS TEMPERATURES ON CONTACT SURFACES DUE TO FRICTION.
by B. P. Stoyukhin and tr. by Ingeborg V. Baker.
2 Mar 64, 19p.
RSIC 142 Unclassified report

Trans. from Nauchnye Doklady Vysshei Shkoly; Mashinostroyenie i Priborostroyenie, NO. 4, pp. 73-81, 1958.

Descriptors: (*Surface temperatures, Friction). Thermal conductivity, Mathematical analysis, Thermal stresses, Sliding contacts, Surfaces.

AD-434 560 Div. 25
OTS price $3.60

Courant Inst. of Mathematical Sciences, New York Univ., N.Y.
STRESSES IN A PERFORATED CYLINDRICAL SHELL,
by Frances Baver and Edward L. Reiss. Feb 64,
33p. Rept. no. 320
Contract Nonr285 42
Unclassified report

Descriptors: (*Cylindrical bodies, Structural shells), (*Structural shells, Stresses), (*Stresses, Numerical analysis), Elastic shells, Deformation, Boundary value problem, Difference equations, Mathematical prediction, Equations, Surface areas.

It is assumed that the deformations of a thin cylindrical elastic shell, subjected to a uniform lateral pressure, are adequately described by the Donnell shell equations. The surface of the shell is perforated by a rectangular cutout. The tangential membrane displacements and the normal membrane stresses vanish on the simply supported edges of the hole and the ends of the cylinder. Numerical solutions are obtained by replacing the boundary value problem by a finite difference approximation and solving the resulting system of linear algebraic equations by an iteration procedure. (Author)

AD-434 565 Div. 25
OTS price $1.10

Queen's Univ., Belfast (Northern Ireland).
THE FINE STRUCTURE OF THE 2P TERMS OF THE LITHIUM ISOELECTRONIC SEQUENCE,
by K. L. Bell and A. L. Stewart. 1962, 10p.
Rept. no. SR1
Contract AF EOAR63 85
AFCRL 64 112 Unclassified report

Descriptors: (*Lithium, Atomic energy levels), (*Atomic structure, Lithium), Atomic orbitals, Electron density, Hyperfine structure.

Ab initio calculations of the fine structure separation of the 1S2np2p, n- 2, 3 and 4, states of the three electron systems are made using wave functions of the open shell type. Satisfactory agreement with experiment is obtained only in the case of the highly ionized systems. (Author)

AD-434 569 Div. 25
OTS price $1.60

Naval Ordnance Test Station, China Lake, Calif.
MAGNETOHYDRODYNAMIC THEORY OF DEFLAGRATION AND DETONATION.
Rept. for Dec 59-Feb 60,
by H. S. Green. Mar 64, 12p.
NOTS TP324 NAVWEPS 8132
Unclassified report

Descriptors: (*Deflagration, Theory), (*Detonations, Theory), (*Magnetohydrodynamics, Deflagration), Detonation waves, Analysis, Ionization, Impurities, Temperature, Friction, Turbulence, Ultrasonic radiation, Shock waves, Electromagnetic waves, Combustion.

An analysis is presented of the influence of ionization on the processes accompanying deflagration and detonation. Under suitable conditions, ionization can be effected by (1) the presence of impurities, (2) increase in temperature, (3) friction and turbulence, (4) increase in static presence, (5) ultrasonic and shock waves, and (6) electromagnetic waves and radiations. In combustion and explosion most of these effects

will be present, but the shock and electromagnetic waves, which prpagate faster than the rest, will be of prime importance. The electromagnetic wave is technically a magnetohydrodynamic wave. Properties of these waves are discussed in the rigorous ionic theory and the effect of ionic relaxation phenomena is described. (Author)

AD-434 574 Div. 25
OTS price $1.60

Space Sciences Lab., General Electric Co., Philadelphia, Pa.
INVESTIGATION OF NON-EQUILIBRIUM IONIZATION FOR MHD ENERGY CONVERSION.
Quarterly rept. no. 8, 15 Dec 63-15 Mar 64, by B. Hoffman. 15 Mar 64, 20p.
Contract AF33 657 8298, Proj. 8173, Task 817306
Unclassified report

Descriptors: (*Magnetohydrodynamics, Energy conversion), (*Energy conversion, Magnetohydrodynamics), (*Ionization, Magnetohydrodynamics), Electric fields, Generators, Electrical properties, Potassium, Pressure, Alkali metals, Vapors, Instrumentation, Electrons.

This eighth quarterly reports accomplishments during the period 15 December 1963 to 15 March 1964 on a theoretical and applied research program directed toward prolonging the lifetime of magnetohydrodynamic (MHD) energy converters to the range 1000 K to 2000 K. The process of interest is the use of the self-induced electric field in the MHD generator for electrical breakdown of appropriate working fluids of interest. Work at present is directed toward the use of potassium for Rankine (vapor) cycles. (Author)

AD-434 583 Div. 25
OTS price $6.60

Birmingham Univ. (England).
THE STUDY OF IONIC PROCESSES IN GASEOUS AFTERGLOWS.
Final technical rept.,
by D. Smith, M. J. Copsey and J. Sayers.
Oct 63, 67p.
Grant AF EOARDC61 15
AFCRL 64 107 Unclassified report

Descriptors: (*Glow discharges, Gases), (*Gases, Glow discharges), Atmosphere, Measurement, Degradation, Ionic current, Ions, Radio frequency, Energy, Mass spectroscopy, Mass spectrum, Linear accelerators, Helium.

The report is concerned with measurements of the decay of the densities of ion species in the afterglows following pulsed radiofrequency discharges in atmospheric gases, in order to determine the reaction rates at thermal energies between various ions and neutral species. The following reactions have been investigated: (1) The decay of the helium ion density in pure helium afterglows and the subsequent deduction of the ambipolar diffusion coefficient of the helium ion in helium gas molecules; (2) The charge exchange rates of the oxygen ion with oxygen and nitrogen molecules; (3) The charge exchange rates of the helium ion with oxygen and nitrogen molecules; (4) The decay rate of the nitrogen ion in pure nitrogen gas preliminary to charge exchange rate measurements between the nitrogen and casesium vapour. (Author)

AD-434 586 Div. 25, 2
OTS price $2.60

Air Force Cambridge Research Labs., Bedford, Mass.
FEASIBILITY OF A LUNAR OPTICAL RANGING EXPERIMENT,
by Robert L. Iliff and Michael S. Tavenner.
Dec 63, 24p.
Proj. 7600
AFCRL 63 908 Unclassified report

Descriptors: (*Lasers, Range finding), (*Range finding, Lasers), Moon, Photomultipliers, Background, Scattering, Photons, Night sky, Resolution.

A lunar ranging experiment using a high energy pulsed laser is discussed giving special attention to the required minimum return signal, interfering radiation, detector devices, and pulse length. (Author)

AD-434 593 Div. 25
OTS price $1.10

Wales Univ., Cardiff.
AUGER EFFECTS INVOLVING RECOMBINATION CENTRES,
by R. T. Landsberg, D. A. Evans and C. Rhys-Roberts. 13 Nov 63, 6p. Technical note no. 2
Contract AF61 052 664
AFCRL 63 946 Unclassified report

Descriptors: (*Semiconductors, Solid state physics), Crystal lattices, Color centers, Germanium, Impurities, Copper, Diffusion, Electrons.

The concentration dependence of the lifetime of minority carriers in copper-diffused germanium is explained quantitatively. The fit yields an Auger effect mass-action constant which is shown to be in order-of-magnitude agreement with theory. (Author)

AD-434 679 Div. 25
OTS price $8.60

Brown Univ., Providence, R. I., Div. of Applied Mathematics.
MULTIPOLAR CONTINUUM MECHANICS,
by A. E. Green and R. S. Rivlin. Mar 64, 96p.
Technical rept. nos. 88, C11 88
Contract Nonr562 10, Proj. NR064 406
Unclassified report

Descriptors: (*Continuum mechanics, Stresses), (*Fluid mechanics, Continuum mechanics), Velocity, Analysis of variance, Entropy, Inequalities, Combinatorial analysis, Elasticity, Theory.

A general theory of multipolar displacement and velocity fields with corresponding multipolar body and surface forces and multipolar stresses is developed using an energy principle, an entropy production inequality and invariance conditions under superposed rigid body motions. Constitutive equations for the multipolar stresses are discussed and explicit results are given for an elastic medium. (Author)

AD-434 682 Div. 25
OTS price $1.60

Brown Univ., Providence, R. I., Div. of Applied Mathematics.
FREQUENCY RESPONSE OF NON-LINEAR VISCOELASTIC SOLIDS,
by F. J. Lockett and M. E. Gurtin. Mar 64, 17p.
Rept. nos. C11 90, 562 30 7
Contracts Nonr562 10, Nonr562 30, Projs. NR064 406, NR064 450
Unclassified report

Descriptors: (*Viscoelasticity, Solids), (*Solids, Bandwidth), (*Bandwidth, Viscoelas-

ticity), Nonlinear systems, Integral transforms, Stresses, Strain (Mechanics), Theory, Functions, Integral equations.

AD-434 699 Div. 25
OTS price $4.60

Stanford Research Inst., Menlo Park, Calif.
THE ROLE OF ALUMINUM AND ITS OXIDES AS SOURCES OR MODERATORS OF ELECTRONS IN SOLID PROPELLANT ROCKET EXHAUSTS.
Quarterly status rept. no. 6, 1 Oct-3 Dec 63, by G. Neil Spokes. 31 Dec 63, 50p.
Contract AF04 694 128, SRI Proj. PAU4134, pt. 2
Unclassified report

Descriptors: (*Plasma physics, Exhaust gases), (*Thermionic emission, Plasma physics), (*Ionization, Surfaces), Ions, Electrons, Density, Gas ionization, Mass spectroscopy, Nitrogen, Nitrogen compounds, Surfaces, Combustion chambers, Aluminum compounds, Oxides, Particles, Mathematical models, Measurement, Ionization potentials, Photoelectric effect, Laboratory equipment, Wave transmission, Mathematical analysis.

Evidence is presented for the occurrence of reactions which liberate ions from surfaces. Ions thus ejected from a wall in an atmosphere of active nitrogen include NO+, N+, N2+, N3+, and N4+. Surface chemionization reactions of this kind could be important in the production of excess ionization in rocket exhausts. A model is given for the propagation of electromagnetic waves through gas-particle plasmas. A refined approach was adopted for theoretical study of electron distributions about particles emitting thermionic electrons. Some preliminary results are given. (Author)

AD-434 704 Div. 25, 15
OTS price $1.10

Brown U. Div. of Applied Mathematics, Providence, R. I.
REPRESENTATION THEOREMS IN THE MECHANICS OF MATERIALS WITH MEMORY,
by Rafael V. S. Chacon and Ronald S. Rivlin. Feb 64, 10p. Technical rept. no. C11 89
Contract Nonr56210, Proj. NR 064 406
Unclassified report

Descriptors: (*Materials, Deformation), (*Stresses, Topology), Transformations (Mathematics), Polynomials, Functions, Theory.

It is shown how the Stone-Weierstrass theorem can be used to obtain constitutive equations for materials with memory which possess some symmetry in their reference state. (Author)

AD-434 709 Div. 25, 7
OTS price $2.60

Space Sciences Lab. General Electric Co., Philadelphia, Pa.
RESISTANCE VARIATION OF EXPLODING WIRES,
by Robert C. Good, Jr. Mar 64, 23p. Rept. no. R64SD23
Unclassified report

Descriptors: (*Exploding wires, Resistance (Electrical)), (*Circuits, Equations), Shock waves, Oscillation, Capacitors, Series, Curve fitting, Measurement, Inductance, Electric discharges, Capacitance.

When fine wires are exploded by discharging a capacitor, the circuit exhibits damped electrical oscillations as an L-R-C circuit; however, the resistance varies during the explosion which complicates the analysis. To date the resistance has been calculated either by integrating twice in succession the record of the rate of change of the current, or by the current-voltage method. A different approach is proposed in which the curcuit equation is differentiated with respect to time and then solved by a method similar to the WKB method. The method will be discussed, original data provided, and values of calculated resistance obtained by the double integration method will be used to indicate the validity of the solution. (Author)

AD-434 712 Div. 25
OTS price $4.60

Aerospace Information Div., Washington, D. C.
DETECTION OF THE TRIPLET STATE BY EPR AND OTHER METHODS. COMPILATION OF ABSTRACTS BASED ON SOVIET OPEN LITERATURE.
31 Mar 64, 44p.
AID P64 17 Unclassified report

Descriptors: (*Abstracts, Spectroscopy), (*Luminescence, Abstracts), (*Bibliographies, Luminescence), (*Reviews, Spectroscopy), Dyes, Atomic energy levels, Alkali metal compounds, Excitation, Electron transitions, Line spectrum.

AD-434 716 Div. 25
OTS price $2.60

Oklahoma U. Research Inst., Norman.
THE EFFECT OF DISLOCATIONS AND ORIENTATION UPON THE ELECTRICAL DOUBLE LAYER CAPACITY OF SILVER SURFACES. PART I. SUPPLEMENT TO FINAL REPORT OF MARCH 1, 1963: THE EFFECT OF SURFACE PREPARATION AND DISLOCATIONS ON THE SILVER CATALYZED DECOMPOSITION OF FORMIC ACID. PART II.
Final rept.,
by R. G. Rein, C. M. Sliepcevich and R. D. Daniels. 1 Apr 64, 25p.
Contract Nonr98208, Task NR051 418
Unclassified report

Descriptors: (*Surfaces, Silver), (*Silver, Surfaces), (*Catalysis, Silver), (*Catalysts, Silver), (*Acids, Decomposition), Crystals, Crystal growth, Measurement, Hydrogen, Density, Temperature, Electrodes, Adsorption, Mercury, Nickel.

In order to gain more insight into the effects of dislocations and crystal orientation on the catalytic action of metals this research was conducted to determine the effect of dislocation density and crystal orientation on a microscopic area of silver. The results of an experimental investigation to determine the effect of dislocations on catalytic activity are presented. The dislocation density, superficial surface area, hydrogen overpotential area, and mass of a silver catalyst were measured, and the (211) plane of the metal was subsequently used to catalyze the decomposition of formic acid. Although surface preparation of the catalyst was found to have a significant effect on the rate of decomposition, variation in dislocation densities had no observable effect. (Author)

AD-434 718 Div. 25, 17
OTS price $1.60

Stanford U., Calif.
AN ANALYSIS OF CREEP RUPTURE,
by Robert L. Carlson. Feb 64, 15p. Rept. no. SUDAER 183, TR5
Contract Nonr22547, Proj. NR064 434
Unclassified report

Descriptors: (*Mechanics, Failure (Mechanics)), (*Creep, Rupture), Ductility, Brittleness, Stresses, Strain (Mechanics), Time, Temperature, Theory, Deformation, Plasticity, Mathematical analysis, Loading (Mechanics), Functions,

Mechanical working, Hardening, Compressive properties, Tensile properties, Stability, Buckling (Mechanics), Aluminum alloys.

Ductile creep rupture is considered and an analysis of a work-hardening plastic material which is subject to creep is made. Under a constant tensile load, the true stress acting on a creep specimen increases and the rate of work-hardening decreases. It is shown that tensile instability develops when the rate of work-hardening becomes equal to the true stress. It is noted that both tensile instability and creep rupture, and compressive instability and column creep buckling are controlled by the current state of work-hardening. (Author)

AD-434 738 Div. 25
OTS price $3.60

Polytechnic Inst. of Brooklyn, N. Y.
PARAMETRIC EXPANSIONS FOR OVAL REINFORCING RINGS,
by William P. Vafakos and Neil Nissel. Mar. 64, 37p. PIBAL Rept. no. 684
Contract Nonr83914, Proj. NR064 167
Unclassified report

Descriptors: (*Rings, Analysis), Design, Differential equations, Cylindrical bodies, Loading (Mechanics), Stresses, Structural shells.

In the analysis of ring-reinforced oval cylinders it is convenient to choose for the local curvature of the oval expressions which simplify the shell analysis, even at the expense of introducing minor complexities in the analysis of the ring. On the basis of such an expression formulas are derived for the stresses and displacement in a deep oval ring which is subjected to arbitrary distributed radial and circumferential loads. The results, which are sufficiently accurate for design purposes, are obtained as power series expansions in a parameter which fixes the major-to-minor axis ratio of the oval. (Author)

AD-434 746 Div. 25
OTS price $2.60

Army Electronics Research and Development Agency, Fort Monmouth, N. J.
THE DEISGN AND USE OF DIFFUSION FILL DEVICES IN ULTRA-HIGH VACUUM APPLICATIONS,
by Rudolf G. Buser and John J. Sullivan. Feb 64, 24p.
Task 1A0 10501B010 34
AELRDL 2420 Unclassified report

Descriptors: (*Gases, Cleaning), (*Vacuum apparatus, Design), Helium, Purification, Construction, Capillaries, Temperature, Mass spectroscopy, Mass spectrum, Water vapor, Theory, Tests, Diffusion, Equations.

The properties of a helium fill device (influx rate, purification factor, intrinsic gas load, and switchnig times) and its application in ultra-high vacuum work are discussed in detail. Several limitations and their remedies are considered and experimental results are given. (Author)

AD-434 756 Div. 25
OTS price $5.60

Stanford Electronics Lab., Stanford U., Calif.
EPITAXIAL VAPOR GROWTH OF III-V COMPOUNDS.
Interim rept. Oct 61-Aug 63,
by J. F. Gibbons and P. C. Prehn. Oct 63, 52p.
TR4711 1, SE63 105
Contract AF33 616 7726, Proj. 4159, Task 415904
RTD TDR63 4238 Unclassified report

Report on Molecular Electronics.

Descriptors: (*Epitaxial growth, Semiconductors), (*Semiconductors, Epitaxial growth), (*Gallium compounds, Semiconductors), (*Arsenides, Gallium compounds), (*Phosphides, Gallium compounds), Reaction kinetics, Thermodynamics, Crystal structure, Laboratory equipment, Laboratory furnaces, Impurities, Chemical reactions, Chemical equilibrium, High-temperature research, Hydrogen, Hydrogen compounds, Chlorides, Gallium alloys, Arsenic alloys, Phosphorus alloys.

This work describes an open-tube method for epitaxial growth of III-V compounds using heterogeneous, gas-solid chemical reactions. Different techniques and reactions are briefly discussed and a simplified model is exposed to a thermodynamic treatment to clarify how different parameters influence the growth process. The experimental apparatus and procedure are outlined and data are given for the growth of the two compound semiconductors, GaAs and GaP, as well as for the ternary GaAs(x)P(1-x) mixtures. Also mentioned is the fabrication of heterojunctions, the possibilities of doping, and closed-tube growth processes. (Author)

AD-434 757 Div. 25
OTS price $6.60

Westinghouse Electric Corp., Pittsburgh, Pa.
RECENT ADVANCES IN MICROWAVE PHONON GENERATION AND DETECTION AND THEIR APPLICATION TO THE STUDY OF PHONON-PHONON INTERACTIONS IN QUARTZ,
by J. de Klerk. 2 Jan 64, 65p. SR5
Contract AF19 604 8826, Proj. 4600, Task 460003
AFCRL 64 58 Unclassified report

Descriptors: (*Cavity resonators, Phonons), Quartz, Crystal structure, Resonance, Microwaves, Design, Manufacturing methods, Attentuation, Tuning devices, Excitation, Measurement, Vibration, Temperature, Frequency.

The design procedure and considerations for a tunable resonant coaxial microwave cavity are discussed. The design of a practical cavity for use between 1 and 8 Kmc/sec is given. A technique for producing exponentially decaying echo envelops is described. A method of accurately measuring small changes in low attenuation rates is given. Measurements made in quartz at low temperatures and at 1000 mc/sec are described. (Author)

AD-434 761 Div. 25
OTS price $8.10

Air Development Center, Griffiss Air Force Base, N. Y.
PLASMA DIAGNOSTICS USING THE RAMAN EFFECT,
by Raymond P. Urtz, Jr. Mar 64, 83p.
Task DW63 29
RADC TDR64 5 Unclassified report

In cooperation with Republic Aviation Corp., Farmingdale, N. Y., Contract AF30 602 3071.

Descriptors: (*Plasma physics, Lasers), Raman spectroscopy, Atmospheric entry, Plasma sheath, Theory.

A novel plasma diagnostic technique is presented which utilizes the Raman scattering of a laser beam from a plasma. Detection of the Raman scattering will provide qualitative information on the molecular and ionic species present in a plasma. By measuring the relative intensities of the Stokes and anti-Stokes Raman lines a determination can be made of the density and temperature

of the individual species present in a plasma. The theory correlating the Raman intensity with the specie density and temperature is presented along with preliminary experimental results. The applicability of this technique in connection with various types of plasmas is shown. (Author)

AD-434 764 Div. 25
OTS price $9.60

Technical Research Group, Syosset, N. Y.
MM-WAVE AMPLIFICATION BY RESONANCE SATURATION IN GASES.
Final rept.,
by Benjamin Senitzky. Mar 64, 112p.
Contract AF30 602 2744, Proj. 4519, Task 451904
RADC TDR63 562 Unclassified report

Descriptors: (*Gases, Resonance absorption), Millimeter waves, Paramagnetic resonance, Waveguides, Cavity resonators, Electromagnetic waves, Attenuation, Molecular spectroscopy, Noise, Measurement, Design, Amplifiers, Dipole moments, Boundary value problems.

The power-saturated resonance absorption of a gas has been used to achieve mm-wave amplification. Experiments were conducted at room temperature in both a traveling wave system and in a resonant cavity. The results are in good agreement with theory. A gain of 20 dB was obtained with a 6 inch long, 3/4 inch-diameter cylindrical cavity at 86 Gc. A theoretical analysis indicates that the inherent noise figure of this device is 7 dB. Experimental noise measurements, which were limited by the sensitivity of the available test equipment, yielded an upper value of 25 dB for the noise figure. (Author)

AD-434 765 Div. 25
OTS price $4.60

Ballistic Research Labs., Aberdeen Proving Ground, Md.
CONSTRUCTION AND CALIBRATION OF AN ANTI-COMPTON SPECTROMETER,
by Joseph A. Muscari Jr. Sep 63, 48p.
Proj. 1A022601A088
BRL 1230 Unclassified report

Descriptors: (*Spectrum analyzers, Construction), Calibration, Resolution, Detectors, Gamma-rays, Gamma-ray spectroscopy, Energy, Measurement, Pulse height analyzers, Gamma-ray spectra, Shielding, Electronic equipment, Mathematical analysis, Experimental data.

By suppressing the Compton response the anti-Compton spectrometer emphasizes the photopeak without sacrificing resolution. The detector's response matrix is experimentally determined with five monoenergetic gamma ray sources. By interpolating between these known energies and extrapolating from these measured shapes the response to gamma rays within the range 230 Kev to 1460 Kev is found. Applying the inverse response matrix to several line spectra unfolds the pulse height spectra. (Author)

AD-434 770 Div. 25
OTS price $7.60

Syracuse U., Research Inst., N. Y.
RESEARCH IN THE FAR INFRARED REGION OF THE SPECTRUM.
Final rept.,
by Nathan Ginsburg. 31 Dec 63, 72p.
Contract AF19 628 268, Proj. 8603, Task 860303
AFCRL 64 73 Unclassified report

Descriptors: (*Infrared radiation, Scientific research), Quartz, Germanium compounds, Oxides, Transmissions, Reflection, Temperature, Spectrum analyzers, Polarization, Measurement, Polyethylene plastics, Detectors, Instrumentation, Bolometers.

Investigations in three areas of the far infrared spectroscopy were carried out. These were (1) intensities and widths of lines in the rotational spectrum of water vapor, (2) reflection and transmission measurements on crystals at temperatures down to that of liquid helium, and (3) characteristics of some far infrared detectors. The investigation on the line widths and intensities in the rotational spectrum of water vapor were performed on the far infrared vacuum grating spectrometer designed and constructed here. Pressure broadening by nitrogen and self broadening were measured for three lines and appropriate constants determined by the Ladenburg-Reiche method. (Author)

AD-434 772 Div. 25
OTS price $2.60

Uppsala U. (Sweden).
MAGNETIC FIELD VARIATIONS IN VICINITY OF LIGHTNING DISCHARGES.
Final scientific rept., 1 Oct 58-30 June 63,
by Harald Norinder. 30 June 63, 23p.
Contract AF61 052 171
AFCRL 64 78 Unclassified report

Descriptors: (*Magnetic fields, Lightning), (*Lightning, Magnetic fields), Photographs, Time, Statistical distributions, Electrical equipment, Analysis, Electromagnetic fields, Very low frequency, Propagation, Frequency, Theory.

Daylight photographs of lightning paths in relation to magnetic field variations. Multiple lightning discharges, amplitudes, time sequences in the same or different channels. Statistical distribution of lightning paths from field stations. Mechanism of lightning discharges theoretically investigated. Calculated induced lightning surges on electric transmission lines. Theoretically discussed multiple lightning strokes. (Author)

AD-434 773 Div. 25
OTS price $10.10

Johannes Gutenberg-Universitat (Germany).
RESEARCH ON ATMOSPHERIC OPTICAL RADIATION TRANSMISSION,
by E. de Bary, K. Bullrich, R. Eiden and W. Nowak. 31 Jan 64, 124p. SR2
Contract AF61 052 595
AFCRL 64 126 Unclassified report

Descriptors: (*Light transmission, Atmosphere), (*Atmosphere, Light transmission), Aerosols, Distribution, Polarization, Diffusion, Sky brightness, Scattering, Reflection, Intensity, Theory, Measurements, Instrumentation, Photometers.

AD-434 775 Div. 25
OTS price $1.60

Innsbruck U., (Austria).
HORIZONTAL MAGNETIC DIPOLE IN A CONDUCTING EARTH,
by G. Tinhofer. 25 Nov 63, 19p. TN 6
Contract 61 052 490
AFCRL 64 144 Unclassified report

Report on Research on: Propagation of VLF-waves in solid and liquid media.

Descriptors: (*Magnetic fields, Mathematical analysis), (*Electromagnetic waves, Propagation), Liquids, Solids, Very low frequency, Integral equations, Ionosphere, Dipole moments, Underground.

AD-434 790 Div. 25
OTS price $8.10

Queen Mary Coll., U. of London (Gt. Brit.).
A THEORETICAL INVESTIGATION OF DIFFUSION IN RAREFIED GASES.
Final technical rept.,
by V. C. A. Ferraro. 30 Sep 63, 86p.
Grant AF EOAR61 41
AFCRL 64 75 Unclassified report

Descriptors: (*Gases, Diffusion), Geophysics, Ionospheric propagation, Electron density, Solar flares, Operators (Mathematics), Series, Exosphere, Electrons, Magnetic fields, Terrestrial magnetism, Hydrogen, Helium, Ions, Thermodynamics.

Some investigations are carried over from the first report No. AF61(052)-299 and also some new investigations are reported. Chapters 3, 4 and 5 complete the investigations on the effects of vertical diffusion and drift in the F2 region. Chapters 1 and 2 deal with the effect of the geomagnetic field on diffusion in the F2 region near the geomagnetic equator. Chapter 6 is a recently completed extension of this investigation to estimate the importance of electrodynamic drift. Finally, Chapter 7 indicates a convenient way of calculating the distribution of hydrogen and helium ions in the exosphere on the assumption of thermodynamic equilibrium. (Author)

AD-434 795 Div. 25
OTS price $2.00

Cincinnati U., Ohio.
AN EXPERIMENTAL STUDY OF THE EFFECT OF AN ELECTRIC FIELD ON THE SHARP GREEN FLUORESCENCE TRANSITIONS OF E R IV IN SINGLE CRYSTALLINE FLUORITE,
by Perry Pappas Yaney. Jan 64, 72p.
Contract AF33 616 7450, Proj. 7360, Task 736005
RTD TDR63 4017 Unclassified report

Report on The Chemistry and Physics of Materials.

Descriptors: (*Calcium compounds, Fluorides), (*Single crystals, Fluorides), (*Fluorescence, Spectroscopy), (*Spectroscopy, Fluorescence), (*Electric fields, Fluorescence), Measurement, Non-linear systems, Atoms, Electrons, Linear systems.

An investigation of the strong, green fluorescence spectra of calcium fluoride dilutely doped with erbium was made at 77 and 4.2 K. The spectra were found to arise in three nonequivalent sites. The sites were identified as of cubic symmetry, of trigonally distorted cubic symmetry, and of tetragonally distorted cubic symmetry. Crystal field splitting schemes are proposed for each site. The ratio of the 6th order to 4th order potentials of the cubic crystal field is estimated to be -0.13. The relative shifts in the wavelengths of the sharp transitions to the low lying levels of the ground state, uniform, externally applied electric field were measured in the cubic sites at 77 and 4.2 K and in the trigonally distorted sites at 4.2 K. The measurements were made using three crystals with the field parallel to one of the (1 0), (1 0), and (111) directions of the crystal, respectively, and with applied fields up to 160 kv/cm. The results at 77 K show the presence of dominant nonlinear shifts superimposed on weak linear shifts. Dominant linear shifts were observed at 4.2 K. (Author)

AD-434 805 Div. 25, 30
OTS price $3.60

Midwest Research Inst., Kansas City, Mo.
THE STRUCTURE AND STRENGTH OF EPITAXIAL FILMS.
Bimonthly progress rept. no. 2, 17 Dec 63-17 Feb 64,
by M. Lavik, A. Cunningham and P. Bryant.
16 Mar 64, 34p.
Contract NOw64 0061d, MRI Proj. 2742P
Unclassified report

Descriptors: (*Metal films, Epitaxial growth), (*Vacuum apparatus, Design), (*Structural properties, Stresses), Bibliographies.

The literature review initiated in the previous report has been extended and categorized with a coding system. The coded bibliography containing 200 references is included in this report. A vacuum system, evaporation chamber, substrate holder, and straining device have been designed. A brief discussion of these units, with drawings, is included. (Author)

AD-434 842 Div. 25
OTS price $6.60

Gas Dynamics Lab., Princeton U., N. J.
THE LANGMUIR PROBE IN A COLLISIONLESS PLASMA,
by S. H. Lam. Mar 64, 69p. Rept. no. 681
Contract AF49 638 1271
AFOSR 64 0353 Unclassified report

Descriptors: (*Probes (Electromagnetic), Plasma medium), Ionization potentials, Particle trajectories, Statistical functions, Special functions (Mathematical), Spheres, Cylindrical bodies, Plasma sheath, Particles, Statistical mechanics, Tables, Numerical analysis.

This paper presents an asymptotic analysis of the Langmuir probe problem in a quiescent, collisionless plasma in the limit of large body dimension to Debye length ratio. The structures of the electric potential distribution about spheres and cylinders are analyzed and discussed in detail. It is shown that when the probe potential is smaller than approximately 1/2-KT, where T is the undisturbed temperature of the repelled particles, there exists no sheath adjacent to the solid surface. At large body potentials, for which a sheath is present, the electric potential distribution is given in terms of several universal functions. Master current-voltage characteristic diagrams are given which exhibit clearly the effects of all the pertinent parameters in the problem. An explicit trapped-ion criterion is presented. The general problem with an arbitrary body dimension to Debye-length ratio is qualitatively discussed. (Author)

AD-434 845 Div. 25
OTS price $6.60

Israel Inst. of Tech., (Haifa).
BUCKLING OF ISOTROPIC, ORTHOTROPIC AND RING-STIFFENED CONICAL SHELLS,
by Josef Singer, Abraham Eckstein, Rena Fersht-Scher and Avraham Berkovits. Sep 63, 65p. Rept. no. 30
Grant AFEOAR62 61
AFOSR 64 0591 Unclassified report

Descriptors: (*Buckling (Mechanics), Conical bodies), (*Structural shells, Buckling (Mechanics)), Steel, Aluminum alloys, Hydrostatic pressure, Experimental data, Theory, Equations, Stability.

Results of a continuation of an experimental program on the general and panel instability of thin ring-stiffened conical shells under uniform ex-

ternal pressure are presented and discussed. Tests of ten steel and aluminum-alloy conical shells are described; the results compare favorably with previously developed theories. A method developed previously is now extended to the analysis of the instability of isotropic conical shells under combined torsion and axial compression, and of orthotropic conical shells under combined torsion and external or internal pressure, or axial force. (Author)

AD-434 890 Div. 25
OTS price $3.60

Cruft Lab., Harvard U., Cambridge, Mass.
STATISTICAL FLUCTUATION IN NONLINEAR OPTICAL PROCESSES,
by J. Ducuing and N. Bloembergen. 18 Nov 63, 3p.
TR 430
Contract Nonr1866 16, Proj. NR372 012
Unclassified report

Descriptors: (*Lasers, Nonlinear systems), (*Optical phenomena, Statistical analysis), Stochastic processes, Harmonic analysis, Polarization, Measurement, Ruby, Quartz.

AD-434 894 Div. 25
OTS price $3.60

Ionospharen-Institut Breisach (Germany).
DEVELOPMENT OF A LOW-WEIGHT MEASURING APPARATUS FOR ELECTRON DENSITIES IN A PLASMA,
by K. G. Jacobs. 20 Nov 63, 36p. Rept. no. 7
Contract AF61 052 290
AFCRL 64 247 Unclassified report

Descriptors: (*Plasma medium, Electron density), (*Electron density, Plasma medium), Instrumentation, Measurement, Electrical impedance, Capacitors, Frequency, Resonance, Power, Plasma physics, Perturbation, Theory, Oscillators.

Development and characteristics of an instrument which permit measurement of the electron density by impedance measurements on a plasma condenser with variable frequency. Characteristic frequencies, where certain resonances occur in the plasma and the amplitude of those resonances are the test values of this method. The power level of the measuring frequency can be kept low and the perturbations of the surrounding plasma are negligible. (Author)

AD-434 907 Div. 25
OTS price $3.60

Pittsburgh U., Pa.
RECOMBINATION OF MOLECULAR POSITIVE IONS WITH ELECTRONS,
by M. A. Biondi, T. R. Connor, C. S. Weller and W. H. Kasner. Apr 64, 32p. Rept. nos. TR3, APP5
Contract Nonr62413, Proj. NR012 114
Unclassified report

Descriptors: (*Ions, Recombination reactions), (*Electrons, Recombination reactions), Energy, Dissociation, Theory, Microwave equipment, Spectroscopy, Interferometers, Mass spectroscopy, Gases, Temperature, Neutralization.

Results of studies of the recombination of electrons with molecular positive ions are presented. Theoretical arguments indicate that the dissociative process -- in which a molecular ion captures an electron without change of energy, forming an unstable excited molecule which then dissociates -- provides a highly efficient recombination mechanism. The nature of the process responsible for the large recombination rates observed in Laboratory afterglow studies is investigated using combined microwave, optical spectrometric and interferometric, and mass spectrographic techniques. Dissociative recombination is shown to be the process operative in the laboratory studies, since it is found that (a) molecular positive ions must be present to observe a large recombination rate, (b) when diatomic ions are present, excited atoms are formed in the recombination process, and (c) these excited atoms have kinetic energy of dissociation substantially in excess of thermal energy. (Author)

AD-434 911 Div. 25
OTS price $4.60

Cruft Lab., Harvard U., Cambridge, Mass.
(No title)
Semi-annual progress rept. no. 65, 1 July 62-1 Jan 63,
by J. A. Pierce, R. W. P. King, N. Bloembergen and R. V. Jones. 10 Apr 63, 49p.
Contracts Nonr186607, Nonr186616
Unclassified report

Descriptors: (*Solid state physics, Abstracts), Very low frequency, Ionospheric propagation, Crystal growth, Impurities, Ruby, Paramagnetic resonance, Nuclear resonance, Masers, Relaxation time, Absorption, Dielectric properties, Quantum mechanics, Control systems, Calculus of variations, Stochastic processes, Nonlinear systems, Communication theory, Ferroelectric materials, Ferromagnetic materials, Electromagnetic waves, Electromagnetic fields.

AD-434 942 Div. 25
OTS price $1.10

Foreign Technology Div., Wright-Patterson AFB, Ohio.
PRESSURE DURING EVAPORATION OF A SUBSTANCE IN A BEAM OF RADIATION,
by G. A. Askaryan and E. M. Moroz. 17 July 63, 5p.
FTD MT63 35 Unclassified report

Trans. from Zhurnal Eksperimental'noy I Teoreticheskoy Fiziki, 43:6, pp. 2319-2320, 1962.

Descriptors: (*Electron beams, Pressure), Lasers, Solar radiation, Evaporation, Surfaces, Charged particles, Acceleration, Energy, Intensity, Vapors.

AD-434 943 Div. 25, 4
OTS price $1.10

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
STRUCTURE OF SPECTRUM OF NATURAL RECOMBINATION RADIATION OF GALLIUM ARSENIDE,
by D. N. Nasledov and A. A. Rogachev. 16 July 63, 7p.
FTD MT63 34 Unclassified report

Trans. from Fizika Tverdegele Tela, 4:11, pp. 3346-3348, 1962.

Descriptors: (*Gallium compounds, Arsenides), (*Emissivity, Gallium compounds), Excitation, Cryogenics, Spectroscopy.

AD-434 946 Div. 25
OTS price $1.60

Foreign Technology Div., Wright-Patterson AFB, Ohio.
THERMAL AND OPTICAL EXTERNAL QUENCHING OF

PHOTOLUMINESCENCE KJ-Tl,
by G. G. Liydya and I. V. Yaek. 17 July 63, 15p.
FTD MT63 29 Unclassified report

Trans. from AN Estonskoy SSR. Institut Fiziki I Astronomii, Issledovaniya Po Lyminestsentsii (Trudy), No. 14, pp. 236-246, 1961.

Descriptors: (*Luminescence, Phosphorescent materials), Intensity, Excitation, Optical properties, Halides, Phosphorus, Color centers, Thermal radiation attenuation.

AD-434 950 Div. 25, 2
OTS price $3.60

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
COMPENSATION PHOTOMETER FOR ACCURATE MEASUREMENTS AND REGISTRATION OF TRANSPARENCY OF ATMOSPHERE,
by V. I. Goryshin. 12 Jul 63, 31p.
FTD MT63 15 Unclassified report

Trans. from Glavnaya Geofizicheskaya Observatoriya, (Trudy), Issledovaniya Radiatsionnykh Protsessov, No. 118, pp. 26-41, 1961.

Descriptors: (*Photometers, Analysis), (*Light transmission, Atmosphere), Measurement, Optical properties, Optical equipment, Instrumentation, Photoelectric cells (Semiconductor), Tests, Modulation.

An analysis is given of the work of compensation photometers, intended for measurement and registration of transparency of atmosphere, and main sources of errors are considered. Description is given of a compensation photometer for accurate measurements of transparency of atmosphere with the use of a new method of modulation of light beams and construction of a linear measuring diaphragm. Some results are shown of tests of the instrument. (Author)

AD-434 951 Div. 25
OTS price $1.10

Foreign Technology Div., Wright-Patterson AFB, Ohio.
DISTORTION OF FORM OF ULTRASONIC WAVE OF FINITE AMPLITUDE IN SOLIDS,
by V. A. Krasilnikov and A. A. Gedroyts.
12 Apr 63, 6p.
FTD MT63 13 Unclassified report

Trans. from Vestnik Moskovskogo Universiteta, Seriya III, Fizika, Astronomiya, No. 2, pp. 92-93, 1962.

Descriptors: (*Sound, Propagation), (*Solids, Ultrasonic radiation), Single crystals, Quartz, Nonlinear systems, Equations of state, Shock waves.

AD-434 957 Div. 25
OTS price $1.10

Foreign Technology Div., Wright-Patterson AFB, Ohio.
BEHAVIOR OF A SECOND ORDER DYNAMIC SYSTEM WITHOUT DAMPING UNDER THE INFLUENCE OF RANDOM PROCESSES,
by A. A. Sveshnikov. 24 July 63, 7p.
FTD MT63 75 Unclassified report

Trans. from Izvestiya Akademii Nauk SSSR, OTN, Energetika i Avtomatika, No. 5, pp. 96-98, 1962.

Descriptors: (*Dynamics, Mathematical analysis), Wave functions, Differential equations, Statistical mechanics, Damping, Inertial navigation.

AD-434 958 Div. 25
OTS price $1.10

Foreign Technology Div., Wright-Patterson AFB, Ohio.
IN REFERENCE TO THE THEORY OF ELECTRICAL COAGULATION OF SPHERICAL AEROSOL PARTICLES,
by Yu. V. Shulepov and S. S. Dukhin. 17 July 63, 8p.
FTD MT63 70 Unclassified report

Trans. from Kolloidnyy Zhurnal, 24:6, pp. 749-751, 1962.

Descriptors: (*Particles, Aerosols), (*Coagulation, Particles), Electricity, Theory, Spheres, Charged particles, Differential equations, Density, Acceleration, Gravity, Time, Viscosity, Electric fields, Aerodynamic characteristics, Electrostatics.

AD-434 959 Div. 25
OTS price $1.10

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
CONCERNING THE WARM-UP OF ELECTRONS OF MOVING PLASMA,
by V. M. Eleonskiy and Yu. Ya. Polyak. 16 July 63, 9p.
FTD MT63 66 Unclassified report

Trans. from Zhurnal Prikladnoy Mekhaniki I Tekhnicheskoy Fiziki, No. 5, pp. 48-51, 1962.

Descriptors: (*Electrons, Heating), (*Plasma medium, Temperature), Motion, Hydrodynamics, Fluid flow, Gas ionization, Electrical conductance, Magnetic fields.

AD-434 960 Div. 25
OTS price $1.60

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
HIGH-VOLTAGE PULSE MODE OF IONIC SOURCE PENNING,
by A. V. Chernetskiy. 17 July 63, 15p.
FTD MT63 65 Unclassified report

Trans. from Nekotoryye Voprosy Tekhniki Fizicheskogo Eksperimenta Pri Issledovanii Gazovogo Rasryada, Gosatomizdat, No. 3, Moscow, pp. 105-113, 1961.

Descriptors: (*Pulse generators, Ion sources), (*Ion sources, Pulse generators), Thermonuclear reactions, Buildings, Intensity, Voltage, Gases, Pressure, Frequency, Ionization chambers, Glow discharges, Ionic currents, Anodes (Electron tubes), Cathodes (Electron tubes).

AD-434 970 Div. 25
OTS price $1.10

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
OPTICAL QUENCHING AND STIMULATION OF CERTAIN ZnS PHOSPHORS,
by K. S. K. Rebane and F. A. Savikhin. 12 July 63, 6p.
FTD MT63 41 Unclassified report

Trans. from Akademiya Nauk Estonskoy SSR, Institut Fiziki i Astronomii, Issledovaniya Po Lyuminestsentsii, No. 14, pp. 276-280, 1961.

Descriptors: (*Phosphorescent materials, Quenching (Inhibition)), (*Zinc compounds, Sulfides), Stimulation, Optical phenomena, Copper, Fluxes (Fusion), Quartz, Measurement, Temperature, Luminescence, Spectra (Visible & ultraviolet.

Division 26 - PRODUCTION AND MANAGEMENT

AD-434 973 Div. 25
OTS price $1.10

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
PLASMAS.
12 Nov 63, 9p.
FTD MT63 188 Unclassified report

Trans. from Nauka i Zhizn', No. 6, pp. 33-35, 1963.

Descriptors: (*Plasma medium, Generators), Electromagnetic waves, Photons, Gases.

AD-434 993 Div. 25
OTS price $1.10

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
SOLUTION OF PLANE DYNAMIC PROBLEM OF THEORY OF ELASTICITY BY FOURIER SERIES,
by N. M. Borodachev. 13 Dec 63, 7p.
FTD MT63 134 Unclassified report

Trans. from Izvestiya AN SSSR, Otdeleniye Tekhnicheskikh Nauk Mekhanika i Mashinostroyeniye, No. 5, pp. 161-163, 1960.

Descriptors: (*Elasticity, Theory), (*Fourier analysis, Series), Dynamics, Deformation, Stresses, Vibration, Boundary value problem.

AD-434 998 Div. 25
OTS price $2.60

Foreign Technology Div., Wright-Patterson AFB, Ohio.
CONCERNING RESONANCE IN AN ESSENTIALLY NONLINEAR SYSTEM,
by F. L. Chernous'ko. 14 Nov 63, 29p.
FTD MT63 112 Unclassified report

Trans. from Zhurnal Vychislitel'noy Matematiki i Matematicheskoy Fiziki, AN-SSSR, 3:1, pp. 131-144, 1963.

Descriptors: (*Resonance, Nonlinear systems), Series, Fourier analysis, Differential equations, Parity, Integrals.

AD-435 013 Div. 25
OTS price $1.60

Aerospace Information Div., Washington, D. C.
TWO CONTRIBUTIONS OF O. B. FIRSOV TO ATOMIC SPECTROSCOPY.
8 Apr 64, 18p.
AID T64 18 Unclassified report

Descriptors: (*Atomic spectroscopy, Absorption spectrum), Statistical mechanics, Molecular spectroscopy, Excitation, Electron density, Electron trajectories, Energy, Electrons, Displacement reactions, Quantum statistics, Gases, Density, Perturbation theory.

AD-435 023 Div. 25
OTS price $8.10

Lincoln Lab., Mass. Inst. of Tech., Lexington, Mass.
DIVISION 4. SOLID STATE RESEARCH.
Rept. for 15 Oct 63-15 Jan 64.
9 Mar 64, 84p.
Contract AF19 628 500
ESD TDR64 16 Unclassified report

Descriptors: (*Solid state physics, Scientific research), Lasers, Materials, Band spectrum, Spectroscopy, Solids, Magnetism, Resonance, Luminescence, Single crystals, Infrared radiation, Masers, Dielectric fields.

AD-435 042 Div. 25, 8
OTS price $10.50

Gordon McKay Lab. of Applied Science, Harvard U., Cambridge, Mass.
TRANSPORT PROPERTIES AND BAND STRUCTURE OF GRAY TIN,
by Steven H. Groves. Dec 63, 137p. TR no. HP10
Contract Nonr 1866 10, Proj. NR 017 308
Unclassified report

Descriptors: (*Tin, Electrical properties), (*Semiconductors, Tin), Crystal growth, Transport properties, Crystal structure, Crystal lattices, Single crystals, Impurities, Antimony, Transformations, Transition temperature, Hall effect, Electrical conductance, Pressure, Temperature.

An experimental investigation is described of the dependence of the electrical conductivity and Hall coefficient of gray tin on pressure and temperature. An empirical rule for pressure coefficients has been found from previous studies on many of the group IV and group III - group V semiconductors: the pressure coefficient of a particular energy gap depends on the symmetry of the electron states involved but varies little from material to material. By assuming that this rule includes gray tin, a new model for the band structure is suggested. (Author)

AD-435 079 Div. 25, 4
OTS price $1.10

Metcalf Research Lab., Brown U., Providence, R.I.
THE CRYSTAL STRUCTURE OF BORON TRIFLUORIDE DIHYDRATE,
by W. -B. Bang and G. B. Carpenter. June 63, 8p.
TR 11
Contract Nonr 562 04, Proj. NR017 607
Unclassified report

Descriptors: (*Boron compounds, Fluorides), (*Crystal structure, Boron compounds), Hydrates, X-ray photography, X-ray diffraction analysis.

26. PRODUCTION AND MANAGEMENT

AD-433 525 Div. 26
OTS price $1.10

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
ARRANGEMENT FOR DRAWING WIRE WITH THE USE OF ULTRASOUND,
by V. I. Korshunov and N. V. Korshunova.
7 Jan 64, 4p.
FTD TT63 941 Unclassified report

Patent no. 144140, (Appl. no. 738383/22), pp. 1-2, 14 July 61.

Descriptors: (*Wire, Drawing (Machine processing)), Instrumentation, Design, Vibrators (Mechanical), Patents, Ultrasonic radiation, Oscillation.

AD-433 592 Div. 26
OTS price $1.60

Naval Boiler and Turbine Lab., Philadelphia, Pa.
DIAMOND POWER SPECIALTY CORPORATION 1-1/2in. - 1500 PSI, TYPE I, CLASS 2, STYLE A BOILER BLOWDOWN ANGLE VALVE.
Final rept.,
by J. H. Stevenson. 15 Mar 64, 13p.
NBTL B386 Unclassified report

Descriptors: (*Valves, Blowers), (*Boilers, Valves), Design, Specifications, Tables, Torque, Hydrostatic pressure, Tests, Packing materials, Shipborne, Military requirements.

A 1-1/2in. 1500 PSI, Type I, Class 2, Style A, boiler blowdown angle valve was evaluated to determine compliance with the requirements of Military Specification MIL-V-17737A(SHIPS) of 10 Feb 1956 and Amendment #1 of Apr 1956. The subject valve exhibited excessive operating torque, seat and packing leakage, and galling of the disc holding surfaces at contact with both ends of the stem recess, and was therefore considered unsuitable for use in shipboard boiler blowdown service. (Author)

AD-433 596 Div. 26
OTS price $1.10

Air Force Cambridge Research Labs., Bedford, Mass.
USE OF FAILURE STATISTICS IN DESIGN,
by Walton B. Bishop. Dec 63, 5p.
Proj. 4608
AFCRL 63 590 Unclassified report

Reprint from the July 63 issue Electro-Technology. (Copies also available from DDC)

Descriptors: (*Failure (Mechanics), Probability), Design, Reliability, Statistical analysis, Quality control.

AD-433 660 Div. 26, 15
OTS price $4.60

Mechanical Technology Inc., Latham, N. Y.
ON THE SPIRAL GROOVED, SELF ACTING, GAS BEARING,
by J. H. Vohr and C. H. T. Pan. Jan 64, 48p.
Rept. no. 63TR52
Contract 3730 00, Task NR061 131
Unclassified report

Descriptors: (*Bearings, Hydrodynamics), (*Gas bearings, Configuaration), Mechanical engineering, Mechanics, Design, Pressure, Operation, Analysis, Lubricants, Stability, Geometry, Tables.

AD-433 687 Div. 26, 15, 32
OTS price $2.60

Minnesota U., Minneapolis.
SURVEILLANCE PROBLEMS: WIENER PROCESSES,
by Gordon R. Antelman and I. Richard Savage.
Jan 64, 25p. Technical rept. no. 34
Contract Nonr710 31, Proj. NR0420 003
Unclassified report

Descriptors: (*Production, Optimization), (*Control systems, Production), Economics, Statistical processes, Stochastic processes, Probability, Maintainability.

Results are given for the case of a production process which behaves as a Wiener process. Some of the results applicable to the Wiener case as well as the Poisson case are stated; others are extended to the present case. (Author)

AD-433 690 Div. 26
OTS price $1.60

Case Inst. of Tech., Cleveland, Ohio.
SOME ORDER STATISTICS RELATING TO MARKOV CHAINS: AN APPLICATION TO PURCHASING POLICIES,
by Jose Trevino and S. Sengupta. 1964, 18p.
Technical memo. 15
Contract Nonr1141 11
Unclassified report

Descriptors: (*Operations research, Industrial procurement), (*Industrial procurement, Mathematical analysis), (*Probability, Industrial procurement), Management engineering, Government procurement.

A special instance of the general problem of decision-making under uncertainty is condidered. In the absence of a well-defined utility function, the following method is adopted: First, a reasonable or acceptable policy is chosen with unspecified parameters. Then, the associated decision rule is formulated; typically, these are functional transforms of appropiate state variables. Analysis is made of the outcomes produced by the rule in conjunction with the stochastic price process. Finally, some functionals of the (random) outcomes are computed with a view to obtain measures of performance of the decision rule. In each case, the derivations indicate the dependence of the measures (of performance) on the unspecified parameters. (Author)

AD-433 691 Div. 26
OTS price $2.60

Case Inst. of Tech., Cleveland, Ohio.
MULTI-ITEM PRODUCTION AND INVENTORY MANAGEMENT UNDER PRICE UNCERTAINTY,
by B. P. Banerjee, S. S. Sengupta and G. H. Symonds. 1964, 21p. Technical memo. no. 11
Contract Nonr1141 11
Unclassified report

Descriptors: (*Production, Mathematical models), Economics, Management engineering.

A model is presented for the derivation and implementation of optimal linear decision rule for a firm producing and dealing in a number of interacting products, and possessing partial influence on their prices. The behavior of a multi-item production-inventory complex is represented as the dynamics of suitably defined state variables under the influence of decision rules that are stable and linear in the state variables, but otherwise unspecified. (Author)

AD-434 175 Div. 26
OTS price $1.60

Ammunition Engineering Directorate, Picatinny Arsenal, Dover, N. J.
HERMETIC SEALING OF PROPELLANT CONTAINERS BY PRESSURE WELDING,
by Charles Zglenicki and Louis Silberman.
Mar 64, 19p.
PA TM1373 Unclassified report

Descriptors: (*Welding, Pressure), (*Containers, Seals (Stoppers)), Metal seals, Propellants, Metals, Cold working, Aluminum alloys, Copper.

Pressure welding is the joining of metallic surfaces by application of compressive force alone. No heat is applied to effect a weld by this method. Efficient joints as strong as or stronger than the metals being joined may be had. Weld area strength is actually improved as a result of the cold working. The process is limited to non-ferrous metals. However, dissimilar metals can be welded to each other. Metallurgical bonds are generally achieved if the metal surfaces to be welded are free of oxides and other contamination and sufficient pressure is used. The process was investigated as a means of hermetically sealing propellant in metal containers.

Commercial smokeless powder was sealed in containers and tested for possible degradation after standard exposure tests. This report describes the procedures followed in sealing the containers and subsequent testing. (Author)

AD-434 437 Div. 26
OTS price $4.60

Ampex Corp., Redwood City, Calif.
GROOVED PLATE GAS LUBRICATED THRUST BEARINGS, WITH SPECIAL REFERENCE TO THE SPIRAL GROOVE BEARING,
by M. Wildmann. Jan 64, 47p. Rept. no. RR64 1
Contract Nonr381500.
Unclassified report

Descriptors: (*Thrust bearings, Gas bearings), (*Gas bearings, Thrust bearings), Loading (Mechanics), Equations, Design, Analysis, Configuration, Pressure, Mathematical analysis.

The basic equations governing the behavior of spiral groove gas lubricated thrust bearings are derived, and the assumptions made during this derivation are stated and explained. From these equations, expressions for load for spiral groove thrust bearings are obtained, and optimum performance curves are presented for use by the designer. (Author)

AD-434 450 Div. 26
OTS price $11.50

RAND Corp., Santa Monica, Calif.
TECHNICAL PROGRESS IN TWO-SECTOR MODELS,
by Vincent D. Taylor. Apr 64, 155p. Memo. no. RM 4059PR
Contract AF49 638 700
Unclassified report

Descriptors: (*Management engineering, Mathemathematical models), Economics, Production, Money, Labor.

This memorandum is a theoretical exposition of models useful in the study of the role of technical progress in an economy. The models have a capital goods sector and a consumer goods sector, each of which employs both labor and capital. Production in each sector is governed by a Cobb-Douglas function, which implies constant returns to scale. Only exponential growth paths (where all variables are changing at constant exponential rates) are treated analytically. The memorandum compares shared technical progress, the benefits of which are shared equally by machines of all ages, and embodied technical progress, which consists of technical advances tha must be incorporated in new machines before production can be affected. Technical progress is assumed to proceed at constant exponential rates, and these rates are allowed to differ between sectors. Solutions are derived for a model economy where (1) persons (in the aggregate) desire to save a fraction of gross income that is a function only of the rate of interest, (2) uncertainty is absent, and (3) the lifetimes of machines are economically determined. Exponential solutions are obtained for the cases of pure shared and pure embodied technical progress, and the equilibrium relationships among technical progress and the economic variables are investigated. (Author)

AD-434 945 Div. 26, 17
OTS price $2.60

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
AUTOMATIC ELECTRIC ARC WELDING OF TITANIUM,
by S. M. Gurevich and S. V. Mischenko. 12 July 63, 23p.
FTD MT63 31 Unclassified report

Trans. from Avtomaticheskaya Svarka, No. 5, pp. 1-2, 1956.

Descriptors: (*Titanium, Arc welding), (*Arc welding, Automation), Impurities, Shielding, Gases, Fluxes (Fusion), Physical properties, Arc welds, Grain structures (Metallurgy), Microstructure, Plasticity, Welding fluxes, Air, Hydrogen, Nitrogen, Oxygen, Argon, Helium, Hardness, Thermal joining.

Questions of technology of electric arc welding of titanium by nonfused electrode in stream of inert gas are considered. The peculiarities of automatic welding of titanium under flux are outlined. Data concerning structure and mechanical properties of welded seams are given. (Author)

AD-434 961 Div. 26
OTS price $1.60

Foreign Technology Div., Wright-Patterson AFB, Ohio.
SELF-ADJUSTING SYSTEM OF PROGRAM CONTROL OF METAL-CUTTING MACHINES,
by M. I. Breydo, M. L. Byhovskiy and A. E. Kobrinskii. 15 July 63, 18p.
FTD MT63 64 Unclassified report

Trans. from Avtomatizatsiya Protsessov Mashinostroyeniya, Vol. I; Obshohiye Voprosy I Sredstva Avtomatizatsii, Izd-vo, AN SSSR, Moscow, pp. 289-298, 1962.

Descriptors: (*Machine tools, Automation), (*Control systems, Milling machines), (*Automation, Machine tools), Servomechanisms, Operation, Errors, Feedback, Programming (Computers), Switching circuits, Digital computers, Cutting tools.

AD-434 962 Div. 26, 17, 30
OTS price $1.60

Foreign Technology Div., Wright-Patterson AFB, Ohio.
NEW METHODS OF APPRAISAL OF SURFACE PURITY,
by A. L. Chestnov. 15 July 63, 12p.
FTD MT63 63 Unclassified report

Trans. from Avtomatizatizatsiya Protsessov Mashinostroyeniya, Vol. 1, Obshohiya Voprosy I Sredstva Avtomatizatsii, Izd-vo, AN SSSR, Moscow, pp. 201-206, 1962.

Descriptors: (*Surfaces, Impurities), Surface properties, Test methods.

27. PROPULSION SYSTEMS

AD-433 662 Div. 27
OTS price $2.60

Calorobic Materials Inc., Pearl River, N. Y.
DEVELOPMENT AND UTILIZATION OF OPTIMUM TECHNIQUES FOR THE FABRICATION OF TITANIUM BORONITRIDE ROCKET NOZZLES.
Final rept., 1 July 62-28 Feb 64,
by R. Strickman. Feb 64, 30p. Rept. no. TR371 9 7
Contract DA30 0690RD3747, DA Proj. 59332008
Unclassified report

Descriptors: (*Rocket motor nozzles, Material forming), (*Refractory materials, Synthesis (Chemistry)), Manufacturing methods, Chemical reactions, Powder metals, Titanium, Boron

compounds, Nitrides, Titanium compounds, Borides, Hydraulic presses, Sintering, Heating, Resistance (Electrical), High pressure research, High temperature research, Nozzle inserts, Nondestructive testing, Ultrasonic radiation, Radiography, Machining, Diamond wheels.

Two Techniques were used to produce all of the test specimens and rocket nozzle inserts as required by the contract. All the test specimens, the HTB-2 and three of the HTB-3 rocket nozzle inserts were made by the conventional method in accordance with specifications. A proprietary method involving core heating was used to produce nine of the one-in. throat diameter HTB-3 rocket nozzle inserts and ten of the two-in. throat diameter HTB-4 nozzles in accordance with specifications. With the latter method which initially demonstrated the feasibility of the concept and subsequently involved a scale up of the operation, the appropriate apparatus was designed, constructed and placed into operation. (Author)

AD-433 723 Div. 27
OTS price $8.10

Flight Sciences Lab. Inc., Buffalo, N. Y.
A PARAMETRIC STUDY AND SURVEY OF THE THEORETICAL PERFORMANCE OF THE SUBSONIC COMBUSTION RAMJET,
by, Benjamin Omilian. Oct 63, 84p.
Contract AF49 638 1173
AFOSR 5351 1 Unclassified report

Descriptors: (*Ramjet engines, Hypersonic characteristics), Performance (Engineering), Subsonic characteristics, Supersonic characteristics, Jet engine fuels, Hydrogen, Pentaboranes, Ethylenes, Theory, Diffusion, Thrust, Enthalpy, Specific impulse, Ramjet inlets, Dissociation, Ramjet engine nozzles, Combustion, Effectiveness.

The performance of the subsonic combustion ramjet over the range from Mach 3 to 8 is presented, showing the effects of systematic variations in component efficiencies and flight conditions. Fuels considered are hydrogen, ethylene, and pentaborane. Performance predictions in the literature are reviewed and compared, and differences discussed. The present results are included in the comparison. (Author)

AD-433 751 Div. 27, 26, 12
OTS price $4.60

Ammunition Engineering Directorate, Picatinny Arsenal, Dover, N. J.
LINEAR PROPORTIONAL CONTROL HOT GAS VALVE FOR SECONDARY INJECTION,
by W. F. Lehman and F. P. Crommie. Feb 64, 40p.
DA Proj. 1A222901A203
PA TR3137 Unclassified report

Descriptors: (*Secondary injection, Pneumatic valves), (*Thrust vector control systems, Secondary injection), Rocket motors (Liquid propellant), High temperature research, Refractory metals and alloys, Tantalum alloys, Tungsten alloys, Tungsten, Exhaust gases, Exhaust valves, Design, Construction, Environmental tests, Performance (Engineering), Ceramic materials, Plastic seals, Ablation, Erosion, Thermal insulation, Effectiveness, Bleed systems, Composite materials.

Two linear proportional control hot gas valves were tested as an integral component of a liquid rocket chamber bleed system. One valve relied entirely on the refractory metal, tantalum-tungsten alloy (Ta-10W), whereas the second valve used an arrangement of internal heat sinks, ceramic insulators and ablative plastic inserts to serve as thermal protection for the tungsten surfaces of the critical components. The refractory metal valve failed after three seconds of operation due to severe degradation of the Ta-10W alloy components. In contrast, the composite materials valve successfully completed four 12 sec duration tests, representing 48 sec of accumulative throttling operation without any parts replacement. The valve demonstrated excellent structural durability and reproducible control capability during cyclic throttling. It is firmly believed this design is capable of at least 20 sec of continuous throttling operation under the design mass flows of 5140 F combustion gases. (Author)

AD-433 809 Div. 27, 17, 30
OTS price $4.60

Wright Aeronautical Div., Curtiss-Wright Corp., Wood-ridge, N. J.
DESIGN, DEVELOPMENT AND FABRICATION OF ULTRA-HIGH STRENGTH SOLID PROPELLANT ROCKET MOTOR CASES.
Quarterly progress rept. no. 3, 20 Nov 63-20 Feb 64,
by V. Crane and E. P. Gilewicz. 20 Feb 64, 44p.
Rept. no. 407 3
Contract AF04 611 9064
Unclassified report

Descriptors: (*Rocket cases, Design), (*Rocket motors (Solid propellant), Rocket cases), Nickel alloys, Steel, Aging (Materials), Heat treatment, Martensite, Metallurgy, Optimization, Specification, Guided missiles (Surface-to-surface), Hydrostatic pressure, Filament wound construction, Wire, Instrumentation, Test methods, Mechanical properties, Visual inspection, Forging, Production, Failure (Mechanics), Loading (Mechanics).

AD-434 129 Div. 27
OTS price $7.60

Philco Research Labs., Newport Beach, Calif.
INTERNAL ENVIRONMENT OF SOLID ROCKET NOZZLES.
Quarterly technical rept. no. 3, 1 Dec 63-29 Feb 64,
by F. C. Price, V. A. Marple and R. A. Dupuis.
30 Mar 64, 76p. Rept. no. SP U2543
Contract AF04 611 9072
RPL TDR64 45 Unclassified report

Descriptors: (*Rocket motor nozzles, Design), (*Infrared radiation, Rocket motors (Solid propellant)), Nozzle gas flow, Simulation, Captive tests, Molybdenum, Solid rocket propellants, Particles, Aluminum compounds, Oxides, Emissivity, Movable nozzles, Particle size, Infrared spectroscopy, Test methods, Thermal radiation, Distribution.

Solid propellant nozzle environment was studied to implement nozzle design methods. Study of the condensed phase effects is emphasized. Cold flow modeling technique has been developed to the point of showing quantitative particle impingement rates for the 60-in. diameter engine modeled. Engine firing tests have provided the first data on heat fluxes to a molybdenum nozzle wall showing the effects of impinging alumina. A scanning spectrometer system has been completed for use in analyzing the alumina cloud emissivity. This is especially important in radiation calculations for large engines. (Author)

AD-434 178 Div. 27, 12
OTS price $3.60

Hercules Powder Co., Magna, Utah.
WING II HOT STRUCTURAL DEVELOPMENT TESTS.

WEAPON SYSTEM 133A.
Final rept.,
by R. M. Rawle. 1 Apr 64, 33p. Rept. no. MTI499
Contract AF04 647 243
Unclassified report

Descriptors: (*Rocket motors (Solid propellant), Rocket cases), (*Rocket cases, Loading (Mechanics)), Third-stage motors, Structural properties, Compressive properties, Test equipment, Heaters, Temperature, Instrumentation, Failure (Mechanics), Deflection, Deformation, Guided missiles (Surface-to-surface), Surface temperatures.

Hot structural development tests were conducted to determine the structural integrity of the M-57E1 motor case under simulated flight conditions. To accomplish this, the cases were subjected to external compressive loading conditions in conjunction with increased external surface temperatures. (Author)

AD-434 289 Div. 27, 12
OTS price $8.60

Army Frankford Arsenal, Philadelphia, Pa.
A BASIC INVESTIGATION OF CONTROLLABLE THRUST DEVICES FOR ESCAPE FROM ADVANCED FLIGHT VEHICLES. PHASE II, PART 1. OPERATION UP TO 400 MILES. PART 2. COMPUTER STUDY AND EXPERIMENTAL PROGRAM,
by Charles W. Boaz. Feb 64, 92p.
Proj. 1362, Task 136205
AFA R1672 RTD TDR63 4072 Unclassified report

Report on Crew Escape for Flight Vehicles.

Descriptors: (*Spacecraft, Jettisonable cockpits), (*Controllable thrust rocket motors, Jettisonable cockpits), (*Cartridges (PAD), Jettisonable cockpits), Starting, Tests, Space environmental conditions, Van Allen radiation belt, Pressure, High altitude, Vacuum, Materials, Decomposition, Sublimation, Actuators, Temperature, Meteors, Segmented rocket motors, Pistons, Velocity, Analog computers.

The use of controllable thrust devices for escape from advanced flight vehicles was investigated. Repetitive start-stop-start operations and control of thrust rate and direction were considered for gaseous, liquid, solid, and mechanical systems with respect to problems of operating in environments up to 400 miles. Tests were conducted under this program at standard conditions to evaluate two design ideas for thrust control. First, firings were made on a gas-buffered thruster in conjunction with a computer study. Results indicated that placement of the gas by-pass ports with respect to the thrust-to-buffer area ratios in this specific design were critical for successful operation. The use of propellent gases for buffering eliminates the need for storing liquids or other buffering materials. The second design, a multiple stroke thruster, illustrated the feasibility of using a single device to accomplish a number of desired operations, thereby reducing costs, increasing payloads or space for other equipment. (Author)

AD-434 369 Div. 27
OTS price $4.60

Arnold Engineering Development Center, Arnold Air Force Station, Tenn.
LOCAL HEAT-TRANSFER COEFFICIENTS IN A NOZZLE WITH HIGH-SPEED LAMINAR FLOW,
by William H. Carden. Apr 64, 42p.
Contract AF40 600 1000, Proj. VL2407, Task 895004
AEDC TDR64 61 Unclassified report

Descriptors: (*Rocket motor nozzles, Heat transfer), Design, Laminar flow, Flat plate models, Temperature, Tests, Instrumentation, Thermal radiation, Temperature, Nozzle gas flow.

An experimental investigation of the local heat-transfer coefficient in the throat region of a nozzle operating under conditions of cold wall, thick laminar boundary-layer, low-density, high-speed flow has been conducted. The experimental results have been compared with several analytic procedures for predicting the heat-transfer coefficient in laminar flow. The simple flat plate equation is shown to underestimate the heat-transfer coefficient, while the method of Cohen and Reshotko predicts coefficients which are too large. The incremental flat plate method of Pasqua and Stevens and a modification of a solution of Beckwith and Cohen exhibit good results downstream of the nozzle throat when reference to the value calculated by the simple flat plate equation at the nozzle exit. The effects of thermal raiation upstream of the nozzle throat are indicated. (Author)

AD-434 861 Div. 27
OTS price $6.60

Martin Marietta Corp., Denver, Colo.
TRANSIENT TESTS OF THE YLR 87-AJ-5 ROCKET ENGINE TURBOPUMP WITH THE REDESIGNED FUEL PUMP AND ASSOCIATED PROPULSION EQUIPMENT,
by R. H. Brown, R. H. Fashbaugh and T. C. Shupert.
Mar 64, 64p. Rept. no. CR64 62
Contract AF04 647 576
Unclassified report

Descriptors: (*Turbopumps, Rocket motors (Liquid propellant)), Impellers, Pressure, Oscillation, Propellant control, Pictures, Booster motors, Guided missiles (Surface-to-surface), Fuel pumps.

Two tests were conducted with suction pulsing and one test was conducted with discharge pulsing. The redesigned pump exhibited a significant advantage over the production pump for the parameters which are pertinent to the analysis and reduction of the Titan II longitudinal oscillation. Use of the redesigned fuel pump on the overall system stability must be analyzed in conjunction with the oxidizer system configuration. (Author)

AD-434 892 Div. 27, 12, 25
OTS price $1.60

Arde-Portland Inc., Paramus, N. J.
CRYOGENIC STRETCH-FORMING OF SOLID-PROPELLANT ROCKET CASES.
Quarterly rept. no. 7, 1 Dec 63-28 Feb 64
by R. H. Alper. 28 Feb 64, 16p.
Contract DA30 0690RD3501
Unclassified report

Descriptors: (*Rocket cases, Stretch forming), (*Rocket motor nozzles, Rings), Manufacturing methods, Cryogenics, Effectiveness, Processing, Guided missiles (Surface-to-surface), Rocket motors (Solid propellant).

The objective of the program is to produce experimental, flight-weight rocket motor cases of a configuration similar to Pershing, by the cryogenic stretch-forming process. Previous work demonstrated the feasibility of producing high-strength rocket cases by cryogenci stretch-forming. The present follow-on program is being undertaken to evaluate the process for producing a specific, predetermined, complex-configuration motor case at the strength level previously achieved (240,000 psi nominal yield stress).

Details of this configuration include skirts, forward igniter port, conical aft closure, and nozzle attachment ring. (Author)

AD-434 944 Div. 27
OTS price $1.60

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
BROADENING OF REGION OF STABLE WORK OF A STAGE OF AN AXIAL COMPRESSOR,
by V. N. Ershov and Yu. V. Pavlenko. 17 July 63, 14p.
FTD MT63 33 Unclassified report

Trans. from Teploenergetika, No. 2, pp. 41-44, 1962.

Descriptors: (*Axial-flow compressors, Stability), (*Gas turbines, Axial-flow compressors), Oscillation, Vortices, Degradation, Effectiveness, Turbine wheels.

AD-434 947 Div. 27, 9
OTS price $1.10

Foreign Technology Div., Wright-Patterson AFB, Ohio.
SUPERSONIC EXPIRATION OF GAS OUT OF ASYMMETRIC VESSEL OF FINITE WIDTH DURING MAXIMUM EXPENDITURE,
by S. K. Aslanov. 17 July 63, 10p.
FTD MT63 32 Unclassified report

Trans. from Izvestiya Vysshikh Uchebnykh Zavedeniy, Aviatsionnaya Tekhnika, No. 2, pp. 3-7, 1962.

Descriptors: (*Supersonic nozzles, Configuration), (*Nozzle gas flow, Flight control systems), (*Thrust vector control systems, Secondary injection), Jet mixing flow, Exhaust gases, Deflection, Ramjet engine nozzles, Turbojet exhaust nozzles, Jets.

28. PSYCHOLOGY AND HUMAN ENGINEERING

AD-433 624 Div. 28, 32
OTS price $3.60

Human Engineering Lab., Aberdeen Proving Ground, Md.
VIGILANCE WITH BACKGROUND MUSIC,
by William Wokoun. Aug 63, 32p.
HEL TM16 63 Unclassified report

Descriptors: (*Music, Performance (Human)), (*Attention, Music), Industrial psychology, Fatigue (Physiology), Human engineering.

This study draws together two sorts of work: (1) attempts to improve vigilance performance and use of background music in industrial settings, (2) to explore how background music affects performance on a vigilance task. Fourteen subjects were tested on a simple disjunctive reaction time task, which gave eight stimuli in an hour's session. The independent variable was music (a specially programmed Muzak tape recording) vs. continuous noise (a small fan in the experimental room). The performance of subjects who worked while hearing noise did not change significantly during the hour. However, the subjects who heard background music responded significantly better (faster) during the latter two-thirds of the hour than they had at first. Also, the music group performed significantly better in the middle third of the hour than during the last third. Other tests, comparing the groups with each other, rather than themselves, did not demonstrate significant differences with the number of subjects used. (Author)

AD-433 792 Div. 28
OTS price $4.60

Institute for Behavioral Research U. of Maryland, College Park.
CROSS-CULTURAL INVESTIGATION OF SOME FACTORS IN PERSUASION AND ATTITUDE CHANGE. ORDER EFFECTS IN PERSUASION,
by Elliott McGinnies. Feb 64, 49p, Technical rept. no. 4
Contract Nonr372001, Proj. NR171 250
Unclassified report

Descriptors: (*Psychology, Voice communication systems), Speech, Performance test, Reasoning, Attitudes, Analysis.

AD-433 863 Div. 28
OTS price $2.60

New York State U., Buffalo.
STRATEGY IN THREE GAMES: A REPLICATION,
by W. Edgar Vinacke, Donald Ragusa and Doris Crowell. 15 Feb 64, 21p. Technical rept. 5
Contract Nonr4374 00
Unclassified report

Descriptors: (*Group dynamics, Projective techniques), (*Projective techniques, Group dynamics), Sex, Sociometrics, Test construction (Psychology).

An attempt was made to replicate the situations in which significant differences in strategy occurred between the sexes as a function of differences in the character of games played by triads. Each of two experimenters ran 12 triads through the masculine board game, the masculine quiz game, and the feminine quiz game, with order of games counterbalanced. Three contests of each of four power-patterns were used, namely, All-Equal, One Stronger, All-Different, and All-Powerful. Cumulative scores were maintained as an incentive condition. The sex differences previously ascertained occurred also in this experiment, but the Index of Strategy did not significantly differentiate the three kinds of games. The Feminine Quiz Game did not significantly increase accommodative strategy, as measured by this Index, although the two sexes differed significantly in the predicted direction in each of the games. The Feminine Quiz Game elicited less bargaining in the male triads and more bargaining in the female triads than did the other two games. In the Feminine Quiz Game there was a greater tendency in the female triads for the two players behind to ally, and an opposite tendency in male triads. Both characteristics can be interpreted as reflecting differential interest in the games. (Author)

AD-434 041 Div. 28
OTS price $1.60

Air Force Proving Ground Command, Eglin Air Force Base, Fla.
PERFORMANCE EVALUATION OF APPRENTICE MEDICAL MATERIEL SPECIALISTS,
by Donald I. McSheehy. Mar 64, 16p.
Proj. 0034Q59
APGC TDR64 14 Unclassified report

Descriptors: (*Training, Performance tests), (*Job analysis, Medical personnel), (*Medical supplies, Materials), Aviation personnel, Standards, Automation, Programming (Computers), Analysis, Air force.

This evaluation of 2-weeks duration and 5 apprentices was conducted to determine the ability of apprentices graduated from Air Training Command Course No. ABR90631, Medical Materiel Specialist, to perform the duties of their specialty. Apprentices were trained in manual supply procedures. In assignments using this type of supply procedure, they were able to perform satisfactorily with a minimum of on-the-job training. Supervisors' estimates of 5-skill-level development in approximately 6 months were based on the number of different supply sections with which the apprentice must become familiar rather than any difficulty in training for the work of the section. Apprentices working in a mechanized supply unit required approximately two weeks to become oriented with the different procedures and forms. Supervisors foresaw n problem in training, as it was evident that the apprentices had developed an adequate knowledge of basic supply principles and procedures during their training. Inclusion of a Job Training Standard requirement for training in this area is recommended, with subsequent inclusion in the course. The medical Materiel Specialist Course is in the process of being revised to include instruction in mechanized supply procedures. (Author)

AD-434 042 Div. 28
OTS price $1.60

Air Force Proving Ground Command, Eglin Air Force Base, N. Mex.
PERFORMANCE EVALUATION OF APPRENTICE AIR PASSENGER SPECIALISTS,
by Earl F. Pruitt. Feb 64, 11p.
Proj. 0034Q58
APGC TDR64 11 Unclassified report

Descriptors: (*Training, Performance tests), (*Aviation personnel, Training), Transportation, Loading, Tables, Operation, Standards, Military requirements.

This evaluation was conducted to determine the ability of apprentice air passenger specialists graduated from ATC Course No. ABR60530 to per-

form the duties of their specialty. A 12-week job performance evaluation was conducted using seven apprentices assigned to operating units at Hunter and Charleston Air Force Bases. Apprentices graduated from this course are prepared to meet the requirements of the Job Training Standard and most of the job requirements. To more adequately meet the job requirements, it is desirable that the Job Training Standard be revised as follows: include course and on-the-job training requirements for the various tasks associated with fleet servicing activities, and reduce the course requirement for proving instruction on the dissemination of information on baggage limitations and for providing a working knowledge of the types and configurations of transport aircraft, weight and balance factors, load adjuster and Chart E, and load planning. (Author)

AD-434 211 Div. 28
OTS price $3.60

Illinois Univ., Urbana.
THREE-WAY FACTOR ANALYSIS OF A MULTITRAIT-MULTIMETHOD MATRIX,
by Edward L. Hoffman and Ledyard R. Tucker.
Jan 64, 40p.
Contract Nonr1834 39
Unclassified report

Report on Techniques for Investigation of Structures of Individual Differences in Psychological Phenomena.

Descriptors: (*Factor analysis, Psychology), (*Psychology, Factor analysis), Classification, Models (Simulations), Theory, Training.

Analytical procedures, developed from Tucker's model for the analysis of three-way matrices of data, were applied to a multitrait-multimethod correlation matrix of rating-scale data from the Kelly and Fiske study of VA trainees. Ratings of the trainees by the assessment staff, by the trainees' teammates during the assessment period, and self-ratings by the trainees on 15 of the original 22 variables were analyzed for 124 male trainees. (Author)

AD-434 231 Div. 28
OTS price $11.50

Sylvania Electric Products, Inc., Waltham, Mass.
GROUND ELECTRONICS SYSTEM FOR WS-133B (MINUTEMAN) PERSONNEL SUBSYSTEM TEST & EVALUATION PLAN,
by F. H. Alter. 30 Mar 64, 151p. Rept. no. MPO PD0060
Contract AF04 694 261
Unclassified report

Descriptors: (*Personnel, Performance tests), Electronics, Ground support equipment, Job analysis, Tables, Data, Maintainability, Measurement, Human engineering, Operation, Test methods.

AD-434 251 Div. 28, 30
OTS price $7.60

University of Southern California, Los Angeles.
THE PSYCHOLOGICAL DIMENSIONALITY OF BASIC ELECTRONIC CIRCUITS: II. INTERPRETATION OF THE STATISTICAL DIMENSIONS.
Mar 64, 74p. Technical rept. no. 39
Contract Nonr228 22, Proj. NR153 093
Unclassified report

Descriptors: (*Decision making, Behavior), (*Psychology, Circuits), (*Reasoning, Performance tests), Measurement, Test methods, Analysis, Electronics, Tables.

This is the second of a series of reports presenting the results of applying multidimensional scaling techniques to the analysis of the conceptual difficulty associated with basic electronic circuits. Two multidimensional scaling techniques were applied to thirteen basic electronic circuits. One technique was the standard technique, in which Ss judged the proximity of the circuits with one another; the second was a new technique, in which the proximity judgments were restricted to a ''conceptual difficulty'' referent. The dimensional structures of these two sets of data were analyzed and compared. The comparison showed that the two techniques yielded different dimensional structures. Using the factorial structure as a target, the two dimensional structures were orthogonally rotated to maximum congruence with the target. Multiple regression equations were computed for predicting circuit position on a single scale of conceptual difficulty from either the difficulty dimensions or the circuit characteristics factors. The multiple correlations were high in both cases, .98 when the first two difficulty dimensions are used as predictors and .92 when the three factors are used as predictors. The two rotated difficulty dimensions contributed equally to this prediction. (Author)

AD-434 864 Div. 28
OTS price $1.60

Stanford U., Calif.
PREDICTABILITY OF SMALL GROUP LEADERSHIP CRITERIA,
by Hans E. Lee. Apr 64, 14p. Rept. no. TR7
Contract Nonr22562, Proj. NR171 388
Unclassified report

Report on Perception of Leadership in small Groups.

Descriptors: (*Group dynamics, Leadership), (*Leadership, Group dynamics), (*Sociometrics, Group dynamics), Standards, Social communication, Mathematical prediction, Students, Psychometrics, Emotions, Personality, Achievement tests, Projective techniques, Test construction (Psychology).

From both observational and sociometric data, seven criteria of emergent small group leadership were obtained. The relationships between each of these and 42 psychological scales from tests including the MMPI, Strong Vocational Interest Blank, and the Guilford-Zimmerman Temperament Survey, were examined by constructing, by multiple regression techniques, equations to predict each criteria from some subset of the 42 predictors. When the predicted score and the actual score for each criteria was correlated, no equation led to an r significantly different from zero. The subjects, graduate students in business administration, were in either one of 10 groups of 4 men each or in one of 15 groups of 5 men each. (Author)

AD-434 865 Div. 28
OTS price $1.60

Stanford U., Calif.
AN INVESTIGATION OF THE PRODUCT MOMENT INTERCORRELATIONS AMONG SMALL GROUP LEADERSHIP CRITERIA,
by Hans E. Lee. Mar 64, 17p. Rept. no. TR6
Contract Nonr225 62, Proj. NR171 388
Unclassified report

Report on Perception of Leadership in Small Groups.

Descriptors: (*Leadership, Group dynamics), (*Group dynamics, Leadership), (*Soccometrics, Group dynamics), Social communication, Emotions, Classification, Standards.

This study reports the product-moment intercorrelations among seven criteria of emergent leadership. The subjects, graduate students in business, participated in a small group case discussion. The criteria of leadership were from non-participant observers who classified the action while the discussion was in progress and from the responses of the participants themselves to a sociometric questionnaire. The highest correlation between the observational and sociometric data was between Total Activity and the sociometric question "Which member of the group stood out most definitely as the leader in the discussion." There was also found a tendency towards the differentiation of the task from the social-emotional leader. The principal finding was that the task leader acted the most, and that the person who acted the most was the task leader. (Author)

AD-435 050 Div. 28, 23, 32, 26
OTS price $3.60

Carnegie Inst. of Tech., Graduate School of Industrial Administration, Pittsburgh, Pa.
SOME PROPERTIES OF SCHEDULES FOR LARGE PROJECTS WITH LIMITED RESOURCES,
by J. D. Wiest. 1 Apr 63, 37p. Research memo. no. 111
Contract Nonr76001, Proj. NR047011
Unclassified report

Descriptors: (*Labor, Scheduling), (*Labor, Analysis), (*Scheduling, Feasibility studies), Job analysis, Effectiveness, Personnel management, Costs.

29. QUARTERMASTER EQUIPMENT AND SUPPLIES

AD-433 874 Div. 29
OTS price $4.60

Army Natick Labs., Mass.
INDIVIDUAL CLOTHING AND EQUIPMENT FOR INDIGENOUS FORCES IN SOUTHEAST ASIA.
Rept. 1 June-29 Nov 63.
29 Nov 63, 50p.
ARPA Order 267
Unclassified report

Descriptors: (*Armed forces (Foreign), Clothing), (*Military facilities, Armed forces (Foreign)), Design, Tables, Costs, Military personnel, Anthropometry, Military psychology.

AD-434 193 Div. 29
OTS price $6.60

Matrix Corp., Arlington, Va.
PRESSURE SUIT PRE-FLIGHT SYSTEM. ACTIVITIES, REQUIREMENTS, AND SPECIFICATIONS.
Sep 62, 70p. Rept. no. 62 3
Contract Nonr310700
Unclassified report

Descriptors: (*Pressure suits, Design), Operation, Maintenance, Pilots, Training, Protective clothing, Naval personnel, Military facilities, Military requirements, Specification.

This report presents a basis for evaluating pressure suit ready rooms, both shipboard and shorebased. Recommended ideal facilities and equipment for dressing and locker areas, administrative areas, maintenance areas, and briefing areas are given. The facilities and equipment are directly keyed to the activities of the personnel for whom the areas are designed and the requirements which these activities imply. An important contribution of the research reported is the method presented for updating the evaluation standards as activities and requirements change. (Author)

AD-434 672 Div. 29
OTS price $2.60

Naval Supply Research and Development Facility, Bayonne, N. J.
A COMPARISON APPROACH TO FOOD ACCEPTANCE,
by Ronald L. Heim and Harold R. Ignall. Aug 63, 28p.
Task NT F015 13 02 69
Unclassified report

Descriptors: (*Food, Acceptability), (*Military rations, Acceptability), Naval personnel, Decision making, Analysis, Tests, Test methods, Standardization, Standards, Tables, Statistical analysis.

The study involves the problem of obtaining reliable information from which food acceptability decisions can be made. Taste panel tests and actual naval messing conditions were the two sources of acceptability information considered. The result of the study has been the development of a comparison form which yields information in terms of a comparison made by the individual respondent. The results of taste panel tests and an operational test are presented to demonstrate the attributes of the comparison scale over the hedonic scale technique. The test results have been found to substantiate the contention of an improvement over the hedonic scale. In addition, the comparison form permits precise acceptability statements with a stated level of confidence. Thus, the replacement of subjective judgements by objective decisions can be achieved. (Author)

30. RESEARCH AND RESEARCH EQUIPMENT

AD-433 490 Div. 30
OTS price $9.10

Hudson Labs., Columbia U., Dobbs Ferry, N. Y.
COMPUTER PROGRAM REFERENCE MANUAL OF THE HUDSON LABORATORIES COMPUTING FACILITY VOLUME II, PART I: LISTINGS OF BASIC UTILITY PROGRAMS,
ed. by Melvin Klerer. May 63, 106p. Technical report no. 110; CU132 63
Contract Nonr26684
Unclassified report

Descriptors: (*Programming languages, Handbooks), (*Programming (Computers), Handbooks).

AD-433 491 Div. 30
OTS price $7.60

Hudson Lab., Columbia U., Dobbs Ferry, N. Y.
COMPUTER PROGRAM REFERENCE MANUAL OF THE HUDSON LABORATORIES COMPUTING FACILITY,
by Melvin Klerer. May 63, 73p. Technical rept. no. 111; CU133 63
Contract Nonr26684
Unclassified report

Descriptors: (*Programming languages, Handbooks), (*Programming (Computers), Handbooks).

AD-433 510 Div. 30
OTS price $3.60

Remington Rand, UNIVAC Div., Sperry Rand Corp., St. Paul, Minn.
RESEARCH ON ULTRAHIGH-SPEED DIGITAL TECHINIQUES, PROJECT CROWNER PHASE I.
Final rept. 1 Oct62-30 Sep 63.
30 Sep 63, 38p.
Contract NObsr89113
Unclassified report

Final rept. on first year's work.

Descriptors: (*Magnetic tape, Digital computers), (*Metal films, Data processing systems), Mathematical logic, Magnetic core storage, Magnetostriction, Ferromagnetic materials, Resonance, Magneto-optic effect, Design.

AD-433 513 Div. 30
OTS price $2.60

System Development Corp., Santa Monica, Calif.
A PREFACE TO COMPUTATIONAL STYLISTICS,
by Sally Yeates Sedelow and Walter A. Sedelow, Jr.
17 Feb 64, 24p. Rept. no. SP1534
Unclassified report

Descriptors: (*Language, Analysis), (*Computers, Pattern recognition), Machine translation, Automatic, Abstracts.

Stylistic analysis, the study of patterns formed in the process of the linguistic encoding of information, is of importance to any major research focused upon or dependent upon the production or analysis of language. Through the use of computers, it should be possible to achieve more accurate detection and delineation of such linguistic patterns than has hitherto been the case; a quantitatively rigorous and intense study of pattern or style in natural language called computational stylistics. Computational stylistics has immediate, practical implications for work in areas ranging from machine translation and automatic abstracting to the social sciences and humanities. For adequate machine translations and automatic abstracts, algorithms of normative style for the textual genre being translated or abstracted must be available; the use of the computer for stylistic analysis will help make possible the recognition and specification of such algorithms. Stylistic analysis is also integral to the detection of idiosyncratic uses of language which distinguish one author from another. An author's style is his signature. Through analysis of individual style, researchers can find clues to unique characteristics in linguistic pattern. (Author)

AD-433 515 Div. 30
OTS price $1.10

System Development Corp., Santa Monica, Calif.
SHARE DIGITAL SIMULATION GLOSSARY,
by Patricia Kribs. 20 Feb 64, 10p. Rept. no. SP1562
Unclassified report

Descriptors: (*Indexes, Dictionaries), Digital computers, Simulation.

A glossary is presented covering digital simulation, particularly wholly computerized simulation. Analog, hybrid, and real-time simulation are only cursorily mentioned. (Author)

AD-433 550 Div. 30, 2
OTS price $3.60

Harvard Coll., Cambridge Mass. Observatory.
TEMPERATURE MEASUREMENTS FOR SHOCK HEATED POWDERED SOLIDS,
by E. M. Reeves and W. H. Parkinson. 14 Jan 64, 32p. Rept. no. SR1
Contract Nonr186648, Grant NSG438
Unclassified report

Descriptors: (*Shock tubes, Temperature), (*Temperature, Atomic spectroscopy), Shock waves, Emissivity, Astrophysics, Powders, Thermal radiation, Brightness, Argon, Instrumentation, Calcium, Aluminum, Ultraviolet spectroscopy, Solids.

The temperature behind reflected shock waves were determined for the case of an aerodynamic shock in argon containing a sample of powdered material. Time-resolved temperatures were measured photoelectrically, using the brightness-emissivity method employing a short duration flash tube. The measured temperatures were consistent and about 10% lower than the calculated temperature for pure argon over a 9-electron volt range of atomic excitation energies, indicating that thermodynamic equilibrium was achieved. Calculated and measured densities for the atoms of the powder indicate that approximately 40% of the sample was uniformly distributed behind the reflected shock wave. (Author)

AD-433 551 Div. 30, 15
OTS price $4.60

Northwestern Univ., Evanston, Ill.
OPTIMIZING STATISTICAL ANALYSIS: DATA SCREENING AND PRECONDITIONING,
by A. J. Scott. Feb 64, 47p. TR 7
Contract Nonr1228 26, Task 389 135
Unclassified report

Descriptors: (*Programming (Computers), Handbooks), (*Errors, Statistical analysis), (*Data, Analysis), Analysis of variance, Optimization, Statistical distributions, Mathematical models.

AD-433 579 Div. 30
OTS price $1.10

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
WIDE ANGLE CONDENSERS,
by A. Sh. Shakhverdov. 19 Feb 64, 8p.
FTD TT63 1098 Unclassified report

Trans. from Geodeziya I Kartografiya, no. 1, pp. 43-47, 1962.

Descriptors: (*Lenses, Optical phenomena), (*Optical equipment components, Lenses), Refraction, Equations.

AD-433 582 Div. 30
OTS price $1.10

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
THE UNIVERSAL MEASURING MICROSCOPE, UIM-23.
27 Feb 64, 5p.
FTD TT64 7 Unclassified report

Trans. from Leningradskiy Ekonomicheskiy Administrativnyy Rayon, 2p., 1963.

Descriptors: (*Microscopes, Design), (*Optical equipment, Microscopes).

AD-433 601 Div. 30
OTS price $1.60

Lincoln Lab., Mass. Inst. of Tech., Lexington.
DIVISION 7. ENGINEERING.
Quarterly progress rept., 1 July-31 Aug 63.
15 Sep 63, 13p.
Contract AF19 628 500
ESD TDR63 599 Unclassified report

Descriptors: (*Engineering, Scientific research), Mechanical engineering, Cryogenics, Solar eclipses, Monitors, L band, Antennas, Reentry vehicles, Airborne, Electronic equipment, Space communication systems, Civil engineering, Radomes, Control systems.

Progress summaries are presentd in a number of the more important engineering projects. They indicate, for example, that the conversion of the L-band radar at Millstone Hill is esentially complete, with schemes being attempted for monitoring the performance of the special azimuth bearing; that the second phase in the installation of optical instrumentation in the KC-135 airplane for the PRESS program has been completed, with the final phase under way; that new dispensers and ejection systems are being designed and fabricated under Project West Ford; and that progress is being made in fabricating and assembling the 120-ft antenna system at the Haystack Hill site. (Author)

AD-433 603 Div. 30
OTS price $13.50

Little, Arthur D., Inc., Cambridge, Mass.
AUTOMATIC MESSAGE RETRIEVAL. STUDIES FOR THE DESIGN OF AN ENGLISH COMMAND AND CONTROL LANGUAGE SYSTEM.
Final rept.
Nov 63, 187p. Rept. no. CACL3
Contract AF19 628 256
ESD TDR63 673 Unclassified report

Descriptors: (*Command & control systems, Computers), Automatic, Data storage systems, Information retrieval, Documentation, Language, Machine translation, Vocabulary, Matrix algebra.

An associative searching technique was developed for the automatic storage and retrieval of natural language message information. A user may employ his own vocabulary in formulating a typewritten request, and the technique allows the machine to find relevant information even when there is no direct matching of vocabulary items. The method thus lends itself to ready interaction between computer and user. Answers are based on the network of associations implicit in the stored message data, and items are outputed in order of decreasing relevance to the question. The technique can be advantageously implemented on existing data processing equipment and may eventually be used in conjunction with a novel form of associative memory-processor. The associative retrieval method does not require pre-indexing of the stored information. (Author)

AD-433 609 Div. 30
OTS price $1.60

Aerospace Information Div., Washington, D. C.
THE SPACE-FREQUENCY SPECTRUM OF HIGH-RESOLUTION RADIO INTERFEROMETERS.
23 Mar 64, 19p.
AID T64 14 Unclassified report

Trans. from Izvestiya vysshikh uchebnykh zavedeniy. Radiofizika, 6:3, pp. 437-448, 1963.

Descriptors: (*Radio interferometers, Frequency), Spectroscopy, Resolution, Radio astronomy, Distribution, Brightness, Astrophysics, Distortion, Integration, Cosmic rays, Emissivity, Antennas, Transformations (Mathematics).

The spectra of the space frequencies of high-resolution radio interferometers, which must be known in order to process the results of radio astronomy observations of the distribution of radio brightness across the sky, are investigated by the Astrophysical Laboratory, AN Latvian SSR. The two-dimensional nature of the radiation pattern is taken into account. The possibility of producing an optimum radio interferometer radiation pattern, which would make it possible to obtain the real distribution of radio brightness across the sky with a definite degree of accuracy without further processing, is examined. (Author)

AD-433 670 Div. 30, 9
OTS price $1.60

Arnold Engineering Development Center, Arnold Air Force Station, Tenn.
EVALUATION OF THROAT MATERIALS IN THE HOTSHOT TUNNEL F.
by H. K. Smithson. Mar 64, 18p.
Contract AF40 600 1000, ARO Proj. VT2402
AEDC TDR64 56 Unclassified report

Descriptors: (*Hypersonic wind tunnels, Wind tunnel nozzles), (*Wind tunnel nozzles, Nozzle inserts), Tungsten, Copper, Composite materials, Tungsten compounds, Carbides, Silver, Tantalum alloys, Tungsten alloys, Pyrolytic graphite, Thermal stresses, Erosion, Pressure, Model tests, Fracture (Mechanics).

Several experimental throat materials were tested in the 100-in. Tunnel F. Results of these tests

showed that tungsten and copper-filled tungsten were more satisfactory than other materials investigated. (Author)

AD-433 673 Div. 30, 25
OTS price $1.60

Naval Research Lab., Washington, D. C.
SYSTEM FOR MEASURING SEEBECK COEFFICIENT AND RESISTIVITY.
Final rept.,
by J. E. Ivory. 19 Feb 64, 13p.
Projs. RR010 01 44 5601, SF013 06 29 2857
NRL 6044 Unclassified report

Descriptors: (*Resistance (Electrical), Materials), (*Thermoelectricity, Measurement), Electrical conductance, Wire, Heating, Thermocouples, Temperature, Thermal conductivity.

A rapid method is described for measuring Seebeck coefficient and resistivity of electrical conducting materials which are in the form of a wire or bar. The system is capable of measuring the Seebeck coefficient and resistivity concurrently. (Author)

AD-433 688 Div. 30, 26, 15, 32
OTS price $3.60

Case Inst. of Tech., Cleveland, Ohio.
DECENTRALIZED MANAGEMENT OF INTERACTING PROCESSES: A TECHNIQUE OF NONLINEAR PROGRAMMING (II),
by Leon Lasdon and S. Sengupta. 1964, 34p.
Technical memo. no. 13
Contract Nonr1141 11, Nonr 1141 12
Unclassified report

Descriptors: (*Programming (Computers), Nonlinear systems), (*Operations research, Optimization), Management engineering, Stability Costs, Scheduling, Mathematical models, Partial differential equations, Time, Matrix algebra, Economics, Control, Decision making.

Certain conditions are established under which an equilibrium point of the algorithm of price-adjustment is asymptotically stable in the large. These conditions are phrased as requirements on the functions involved in the original or integrated problem. It is shown that, although the usual concavity requirements (for maximization problems) are sufficient to guarantee stability, much less will suffice. Mathematically, this appears as the fact that, for stability, only the sum of certain quadratic forms - one for each sub-problem- must be negative, so that one or more positive terms may be cancelled by others sufficiently negative. An organizational interpretation of this result is attempted. (Author)

AD-433 689 Div. 30, 26, 15, 32
OTS price $4.60

Case Inst. of Tech., Cleveland, Ohio.
DECENTRALIZED MANAGEMENT OF INTERACTING PROCESSES: A TECHNIQUE OF NONLINEAR PROGRAMMING,
by Leon Lasdon and S. Sengupta. 1964, 47p.
TM 12
Contracts Nonr1141 11, Nonr1141 12
Unclassified report

Descriptors: (*Programming (Computers), Nonlinear systems), (*Operations research, Optimization), Management engineering, Economics, Costs, Control, Scheduling, Mathematical models, Decision making, Matrix algebra, Difference equations, Partial differential equations.

The existence and structure of the scheme is considered; convergence of the price-adjustment rule used by the central agency is discussed. The result, applicable to intereacting processes, promises on a computational basis, significant advantages. Conceptually, it greatly extends the applicability of some basic economic concepts, and indicates the possibility of a merger of pricing theory and equlilbrium of allocation with modern control theory. (Author)

AD-433 721 Div. 30
OTS price $4.60

Coordinated Science Lab., U. of Illinois, Urbana.
THE USE OF ADAPTIVE CONSTRAINED DESCENT IN SYSTEMS DESIGN,
by Tadao Murata. Dec 63, 41p. Rept. no. R 189
Contract DA36 039AMC02208 E, Proj. 3A99 25 004
Unclassified report

Descriptors: (*Networks, Design), (*Design, Programming (Computers)), (*Performance (Engineering), Optimization), Curve fitting, Nonlinear systems, Mapping, Conformal mapping, Statistical analysis, Numerical methods and procedures, Search theory, Programming languages), Filters (Electromagnetic wave), Series, Sequences, Low-pass filters.

This paper describes the application of an iterative method, the adaptive constrained descent, to system design where system parameters are constrained by both upper and lower limits. The method used is essentially a direct search method, not dependent on the use of derivatives or power series approximations. The technique insures convergence and initial guesses can be arbitrarily chosen in some cases. This fact makes it possible to design networks directly from given characteristics using a high-speed digital computer. Also, design problems which used to be attacked by cut and try can be solved fast and in an optimum manner. The method is straightforward and needs only performance index computation and comparison of each trial solution. Details on programming methods are presented with flow charts. (Author)

AD-433 734 Div. 30, 10, 15
OTS price $4.60

Aeronutronic, Newport Beach, Calif.
PROPELLANT OPTIMIZATION PROGRAM FOR COMPUTERS MATHEMATICAL PROCEDURES AND PROGRAMMING.
Final rept.
by E.R. Buley, D.G. Piper, B. Kubert and L. Sashkin. 14 Feb 64, 41p. Pub. no. U2502
Contract AF04 611 8546
RPL TDR64 35 Unclassified report

Descriptors: (*Propellants, Optimization), (*Programming (Computers), Optimization), Linear systems, Programming languages, Matrix algebra, Scheduling.

Modifications to an existing computer program are described, which can determine the composition yielding maximum impulse for multi-compoent propellant mixtures subject to both equality and inequality constraints on the components. The program is coded for up to eight components; the capability extends to ten components. The final report contains the mathematical formulation of the problem and describes the procedures used for the optimization process with the modifications indicated. In addition, instructions for the use of the program and the program flow charts are included. (Author)

Division 30 - RESEARCH AND RESEARCH EQUIPMENT

AD-433 739 Div. 30, 8, 25, 7
OTS price $4.60

Army Electronics Research and Development Agency, Fort Monmouth, N. J.
PUBLICATIONS PRESENTATIONS AND PATENTS, 1963.
1 Jan 64, 43p.
Unclassified report

Descriptors: (*Bibliographies, Electronics), (*Electronics, Bibliographies), Patents, Reports, Symposia, Electronic equipment.

AD-433 802 Div: 30
OTS price $7.00

Stanford Research Inst., Menlo Park, Calif.
CELLULAR LINEAR-INPUT LOGIC,
Final rept.,
by Robert C. Minnick and Robert A. Short. Feb 64, 268p.
Contract AF19 628 498, Proj. 4641, SRI Proj. 4122 Task 464101
AFCRL 64 6 Unclassified report

Descriptors: (*Computer logic, Linear systems), (*Data storage systems, Networks), Circuits, Geometric forms, Bibliographies, Mathematical logic, Switching circuits, Cascade structures, Data processing systems, Topology, Computer logic, Sequences, Trigger circuits.

A number of different cellualr arrays are proposed and studied in this report. These arrays fall into two structural classes: namely, trees and rectangles. It is shown in the report that they can be used for a wide variety of digital tasks. Some of the more important potential applications of cellular arrays are considered. A connection between cellular arrays and tessellations is also pointed out. Cellular arrays for the production of combinational digital logic are studied. Arrays of majority gates are studied both in terms of trees and rectangles. Methods are developed for synthesizing arbitrary combinational functions with a minimum number of gates, within certain structural assumptions. An adder array is described and studied in this section. These arrays produce several arbitrary combinational functions of a set of input variables. Several theorems are proved relating to the types of possible adder arrays and to the number of cells in them. (Author)

AD-433 807 Div. 30, 19, 12
OTS price $8.10

Lockheed Aircraft Corp., Sunnyvale, Calif.
ADAPTIVE CONTROL SYSTEMS: AN ANNOTATED BIBLIOGRAPHY,
comp. by Jack B. Goldmann. Sep 63, 89p.
Special Biblio. SB63 60, 2 75 63 1
Unclassified report

Descriptors: (*Control systems, Bibliographies), (*Adaptive control systems, Bibliographies), (*Bibliographies, Adaptive control systems), Reliability, Automatic, Noise, Detection, Signals, Abstracts.

The application of adaptive control systems to communications systems, automatic reconnaissance techniques, detection of weak signals in noise, and reliability enhancement are the areas of interest emphasized in this annotated bibliography. The references included in the body of this work are concerned with time varying systems, self-optimizing control systems, predictive adaptive controls, optimalizing control systems, self-learning systems, adaptive principles, automatic optimizers, adaptive servomechanisms and extremum control. The abstracted journal articles and reports cover the period 1960-July 1963. (Author)

AD-433 821 Div. 30
OTS price $3.60

Coordinated Science Lab., U. of Illinois, Urbana.
A MODULAR REALIZATION OF SYMMETRIC SEQUENTIAL MACHINES,
by Don W. Rain. Nov 63, 39p. Rept. no. R183
Contract DA36 039AMC02208E, Proj. 3A99 25 004
Unclassified report

Doctoral Thesis.

Descriptors: (*Computers, Sequences), Sequence switches, Networks, Circuits, Cascade structures, Computer logic, Control sequences, Matrix algebra, Feedback, Linear systems.

A class of sequential machines which display certain symmetries in their state diagrams is investigated with emphasis on the cascade-parallel interconnection of elementary, rather than arbitrarily complex, asynchronous sequential machines. It is shown that additional feedback around a (Huffman model) machine may be used to eliminate certain states of the state diagram. This feedback is restricted only in that the delay through the feedback path must be greater than the delay associated with the secondary variables around which the feedback is made. Then it is shown that interconnections of elementary modules yield machines that have symmetric state diagrams, and that feedback may be used to create certain asymmetries. (Author)

AD-433 837 Div. 30, 32
OTS price $2.60

System Development Corp., Santa Monica, Calif.
SDC RESEARCH DIRECTORATE EXTERNAL PUBLICATIONS 1961 - 1963,
by C. Baum and D. A. Rhine. 15 Feb 64, 27p.
Rept. no. TM698 063 00
Unclassified report

Descriptors: (*Documentation, Bibliographies), (*Indexes, Documentation), Data processing systems, Computers, Psychology, Sociology, Operations research, Mathematics, Education, Physics, Engineering, Information retrieval, Language, Teaching machines, Management engineering, Automation, Artificial intelligence, Decision making.

AD-433 850 Div. 30, 32
OTS price $1.60

RAND Corp., Santa Monica, Calif.
U. S.-JAPAN SEMINAR ON MECHANICAL TRANSLATION SUMMARY OF U. S. CONTRIBUTIONS,
by David G. Hays. Mar 64, 13p. Rept. no. P2892
Unclassified report

Descriptors: (*Symposia, Machine translation), (*Machine translation, Symposia), (*Language, Theory), Programming language, Computers, Costs.

AD-433 882 Div. 30
OTS price $.50

Air Force Flight Dynamics Lab., Research and Technology Div., Wright-Patterson Air Force Base, Ohio.
THE AIR FORCE WEAPON SYSTEM ENVIRONMENTAL

PROGRAM,
by R. K. Hankey. Mar 64, 10p.
Proj. 1309, Task 130906
FDL TDR64 20 Unclassified report

Report on Environmental Simulation Investigations for Flight Vehicle Subsystems and Support Equipment.

Descriptors: (*Environmental tests, Air Force equipment), (*Research program administration, Environmental tests), Air Force, Simulation, Weapon systems.

The solution to the environmental problems encountered during weapon system development requires that a systematic and timely environmental program be accomplished on each weapon system developed, environmental research be increased, and the data evolving from research and weapon system environmental programs be collected, analyzed, and made widely available. This report gives a general description of the Air Force weapon system environmental program and indicates areas requiring increased research efforts. (Author)

AD-433 895 Div. 30
OTS price $1.60

Army Frankford Arsenal, Philadelphia, Pa.
INVESTIGATION OF HALL-EFFECT DEVICES FOR FLAW DETECTION IN METALS,
by Harry Sipler. Mar 64, 19p.
Proj. 1H0 24401A111 04
AFA R1710 Unclassified report

Descriptors: (*Hall effect, Non-destructive testing), (*Non-destructive testing, Hall effect), (*Steel, Non-destructive testing), Fracture (Mechanics), Test equipment, Magnetometers, Measurement, Oscillographs, Metals, Surfaces.

The technique of using a Hall generator to plot the flux-leakage due to flaws was established in Frankford Arsenal Report No. R-1581 of February 1961. This effort was extended to study artificial flaws simulating the random slopes and depths encountered in real surface cracks. Improvements were developed in the test instrumentation to allow photographic records to be made via cathode-ray oscilloscope presentations. Determination of vertical flaw depths greater than 30 mils was found to be feasible as in earlier studies. The direction of flaw inclination from the vertical can be determined exactly; the actual angle of inclination can be only roughly determined for all cases. An exact indication of flaw angle was obtained in about 24% of the cases where the flaw specimens were nearly perfect. (Author)

AD-433 897 Div. 30
OTS price $9.10

Sylvania Electric Products, Inc., Waltham, Mass.
DYNAMIC PROGRAMMING TECHNIQUES.
Final rept.
11 Dec 63, 108p. Rept. no. F2030 1
Contract AF30 602 2770, Proj. 5581, Task 55274
RADC TDR64 10 Unclassified report

Descriptors: (*Mathematical logic, Optimization), (*Operations research, Programming (Computers)), Scheduling, Differential equations, Satellite networks, Networks, Communication systems, Stability, Linear systems.

The general theory of the recursive formulation of optimization problems is developed in this report. The conditions under which the problem of minimizing a functional over an abstract set which can be given a recursive formulation are analysed; the distinction between deterministic and nondeterministic programming problems is included. The degree of state dependence of the criterion functional and the degree of Markovian character of the stochastic process generating system trajectories are analyzed for their effect on the recursive formulation. The recursive solution of the problem of finding the minimum value of a functional defined on a collection of curves is considered and the conditions under which the differential relation may be rigorously established are developed. A careful, heuristic, derivation of the Pontryagin Maximum Principle from this differential relation is also given. Problems discussed include the optimum scheduling of link-to-satellite assignments in a non-synchronous satellite communication system and the computation of optimum discrete allocations. (Author)

AD-433 913 Div. 30
OTS price $6.60

Mathematics Research Center, Univ. of Wisconsin, Madison.
LITERATURE REVIEW OF EXPERIMENTAL DESIGN THROUGH 1949,
by W. T. Federer. Feb 64, 62p. Technical summary rept. 405
Contract DA11 0220RD2059
Unclassified report

Descriptors: (*Experimental data, Reviews), (*Bibliographies, Experimental data), Biology, Statistical analysis.

This review of literature in the conduct of, the design of, and the analysis of data from experiments contains a bibliography of slightly less than 1500 references through the year 1949. Reference is made to the several previous bibliographies in this area; since the applications and needs have been traditionally in the various fields of biology, the references are preponderantly from journals which pertain to biology. The historical development, variability of experimental material, conduct of experiments, plot technique, and various types of experimental designs are among the topics discussed. (Author)

AD-433 957 Div. 30
OTS price $1.60

Naval Boiler and Turbine Lab., Philadelphia, Pa.
EVALUATION TESTS OF FLOAT-ACTUATED ELECTRICAL LIQUID LEVEL INDICATING SYSTEM MANUFACTURED BY LIQUIDOMETER CORPORATION.
Evaluation test rept.,
by R. A. Hammaker. 12 Mar 64, 18p.
NBTL Projs. A403 4, SF013 06 20, Task 3950
Unclassified report

Descriptors: (*Liquid level control, Instrumentation), (*Remote control systems, Liquid level control), Tests, Vibration, Temperature, Electric potential, Impact shock, Time, Test methods.

Performance evaluation and shock tests were made on an electrical liquid level indicating system provided by the Liquidometer Corporation. The system was not affected by vibration, temperature or line voltage variations and the response time constant was less than 0.1 seconds. The average non-linearity of the system is 0.9%. In addition, the system will meet the requirements for shock service after the manufacturer makes the recommended modifications. (Author)

Division 30 - RESEARCH AND RESEARCH EQUIPMENT

AD-433 964 Div. 30, 6
OTS price $4.60

Hayes International Corp., Birmingham, Ala.
DESIGN STUDY FOR INFRAFED MEASUREMENT OF PYROTECHNIC FLARES.
Mar 64, 44p.
Contract AF08 635 3789, Proj. 7849
ATL TDR64 10 Unclassified report

Descriptors: (*Flares, Radiometers), (*Radiometers, Flares), Infrared radiation, Measurement, Intensity, Electronic equipment, Sensitivity, Signal-to-noise ratio, Resolution, Calibration, Test equipment, Design.

The results of this contract provide design criteria for radiometric equipment to establish a standard technique to obtain reproducible infrared measurements of pyrothechnic flares when performed by untrained personnel in a wide variety of ambient conditions. The method used to specify the design criteria has been to complete the actual design of an infrared measurement system whose characteristics have been selected as being optimum for flare measurements. Various general techniques and types of instrumentation are commented upon, but no recommendations for the use of specific commercial equipment have been made with respect to flare measurements. This approach will permit evaluation of any particular infrared device for possible use in flare measurement, by comparison of its parameters with those of a system specifically designed for accurate repeatable flare measurements. A separate system for use in quality control during flare manufacture is recommended. (Author)

AD-433 968 Div. 30, 31
OTS price $2.60

Naval Boiler and Turbine Lab., Philadelphia, Pa.
DEVELOPMENT AND EVALUATION OF A BOILER EFFICIENCY COMPUTING AND INDICATING SYSTEM,
by W. F. Reidenbach. 23 Mar 64, 24p.
Proj. SF013 06 06, Task 4183
NBTL B 503 I Unclassified report

Descriptors: (*Special purpose computers, Boilers), (*Data, Recording systems), Performance (Engineering), Effectiveness, Costs, Analysis, Design, Reliability, Tests, Ships.

A boiler efficiency computer was developed as a part of a data recording system and tested and evaluated relative to design, performance, and reliability. The development included: investigation into existing commercially available systems and components which could be integrated into a whole unit, fabrication of the evolved system, calibration of the system, testing of the system under simulated conditions, and comparison with calculated data on an actual test. Results indicated that the system developed was compact, rugged, and within accuracy specifications, and will provide satisfactory information concerning heat losses and boiler efficiency during use aboard ship. (Author)

AD-434 158 Div. 30
OTS price $9.10

Frick Chemical Lab., Princeton Univ., N. J.
DATA PROCESSING, LEAST SQUARES PREPARATION, AND PATTERSON SHARPENING PROGRAMS FOR THE CONTROL DATA CORPORATION 1604,
by B. T. Gorres and R. A. Jacobson. 1 Aug 63, 102p. Technical rept. no. 4
Grant DA ARO D31 124G265, Proj. 3083C
AROD 3083 9 Unclassified report

Descriptors: (*Data, Analysis), (*Programming (Computers), Data processing systems), Corrections, Errors, Programming languages, Control systems, Least squares method, Statistical tests.

The programs described in this report were written to aid in the correction and interpretation of data from a General Electric Single Crystal Orienter. A special program, designed to treat corrected variances was written to remove the dependence on the method of observation. The programs are applicable to triclinic, monoclinic, and orthorhombic space groups. Data processing programs preserve pertinent data on magnetic tape for later use in Patterson sharpening or least squares refinement programs. All programs are written in assembly form and operate in basic machine language. (Author)

AD-434 249 Div. 30
OTS price $3.60

Coordinated Science Lab., Univ. of Illinois, Urbana.
A PLATO PROGRAM FOR INSTRUCTION AND DATA COLLECTION IM MATHEMATICAL PROBLEM SOLVING,
by J. A. Easley, Jr., H. M. Gelder and W. M. Golden. Jan 64, 35p. Rept. no. R185
Contracts DA36 039AMC02208E, NSF G23554, DA Proj. 3A99 25 004
Unclassified report

Descriptors: (*Metamathematics, Programming (Computers)), (*Teaching machines, Mathematics), Programming languages, Computer logic, Mathematical logic, Sequences, Errors, Linear programming, Data processing systems.

Solution of programming problems has been taken in the development of a special teaching logic for the PLATO II computer-based teaching system. This teaching logic, called PROOF, takes advantage of the flexibility and student-controlled sequencing made available in the laboratory or inquiry mode of programming PLATO. (Author)

AD-434 260 Div. 30
OTS price $1.60

Lund Univ. (Sweden).
DESIGN, CONSTRUCTION AND TESTING OF A HEAT OF VAPORIZATION CALORIMETER USEFUL IN THE VAPOR PRESSURE RANGE 1 TO 0.001 (0.0001) MM HG AT 25 C.
Final technical rept. no. 1, 1 Jan 63-1 Jan 64,
by Stig Sunner. 1 Jan 64, 13p.
Contract DA91 591EUC2782
Unclassified report

Descriptors: (*Calorimeters, Design), Construction, Tests, Vaporization, Vapor pressure, Thermochemistry, Temperature, Heat, Measurement.

A micro-calorimeter was built with the purpose of determining heats of vaporization of substances in the vapor pressure range ca. 1 to 10 to the minus3 to 10 to the minus 4 mm Hg. The calorimeter consists of a Knudsen-cell from which the substance is evaporated directly into high-vacuum space. Special care has been taken to ascertain iso-thermal working conditions and to prevent contamination of the vacuum system by vapors, harmful increase of pressure due to the presence of vapor outside the calorimeter and heat leak errors. The system has been partly checked, final testing and preliminary measurements are now under way. (Author)

AD-434 357 Div. 30, 2
OTS price $3.60

Parametrics Inc., Waltham, Mass.
RESEARCH DIRECTED TOWARD THEORETICAL AND EXPERIMENTAL INVESTIGATIONS IN LABORATORY ASTROPHYSICS INVOLVING SHOCK HEATED HIGH TEMPERATURE GASES.
Final rept.,
by Edmund H. Carnevale, Glenn S. Larson and Stanley J. Wolnik. 14 Feb 64, 34p.
Contract AF19 628 2428, Proj. 8635, Task 863503
AFCRL 64 154 Unclassified report

Descriptors: (*Shock tubes, Astrophysics), (*Gas analysis, High-temperature research), Design, Instrumentation, Gases, Measurement, Photographic recording systems, Ultrasonics, Electron beams, Stars, Chemical analysis, Chromatographic analysis.

The design, construction and development of a shock tube facility is described. The spectroscopic, ultrasonic and electronic equipment associated with the shock tube is also described. Simultaneous time resolved photographic and photoelectric records of reflected shock spectra are illustrated. Gas temperature measurement by an ultrasonic pulse method is discussed in addition to a proposed electron beam technique for gas density measurements. (Author)

AD-434 380 Div. 30, 9
OTS price $7.60

Arnold Engineering Development Center, Arnold Air Force Station, Tenn.
AN EXPERIMENTAL STUDY OF DIFFUSERS IN AN OPEN-JET, LOW-DENSITY, HYPERSONIC WIND TUNNEL,
by David E. Boylan. Apr 64, 72p.
Contract AF40 600 1000, Task 895004
AEDC TDR64 47 Unclassified report

Descriptors: (*Hypersonic diffusers, Hypersonic wind tunnels), (*Hypersonic wind tunnels, Hypersonic diffusers), Pressure, Viscosity, Design, Recovery, Diffusers.

An experimental investigation of supersonic diffuser performance in a flow regime in which viscous and compressibility influences are equally important was conducted. The investigation involved Mach numbers from 6 to 16.5. It is shown that, although diffuser recovery compared to higher density regimes is small, using the proper diffuser allowed the required wind tunnel exhaust pressure to be up to 35 times the pressure existing in the test chamber. While this may not seem exceptional at first glance, it is important to note that this was achieved in conjunction with Reynolds numbers on the order of 10 to the minus 3 power below those typical of tunnels yielding higher recoveries. (Author)

AD-434 452 Div. 30, 28, 5
OTS price $10.50

Applied Psychological Services, Wayne, Pa.
INFORMATION TRANSFER IN DISPLAY-CONTROL SYSTEMS.
Final rept.,
ed. by Arthur I. Siegel. Mar 64, 139p.
Contract DA36 039SC87230, Proj. 3A95 20 001
Unclassified report

Descriptors: (*Display systems, Communication theory), (*Display systems, Control systems), (*Communication theory, Display systems), Applied psychology, Human engineering, Errors, Visual signals, Reaction (Psychology), Radar tracking, Monitors, Measurement, Skin, Stimulation, Theory, Electricity, Shock (Pathology), Vision, Galvanic skin response.

The logic, development, reliability, validity, and discriminating power of the Display Evaluative Technique, a technique for quantitatively measuring the ability of the displays in a system to transfer information to the system operator and of the operator to act on that information is first described. Then seven studies into the potential of electrocutaneous information transfer for Signal Corps' equipment systems are reported. The results of these studies support the contention that information transfer through electrical impulses applied to the skin of the system operator could posses considerable merit in certain applications, particularly if this type of signaling system is coupled with a visual or an auditory signal. (Author)

AD-434 539 Div. 30
OTS price $4.60

Arizona Univ., Tucson.
A DELTA-SIGMA MODULATION SYSTEM FOR TIME DELAY AND ANALOG FUNCTION STORAGE,
by H. Handler and R. H. Mangels. Jan 64, 41p.
Grant AF AFOSR89 64
AFOSR 64 0392 Unclassified report

Descriptors: (*Analog-digital computers, Modulators), (*Modulators, Design), Tests, Magnetostrictive elements, Delay lines, Pulse modulation, Modulation.

Modified delta modulation (delta sigma modulation) permits magnetostrictive delay line function storage of analog data with the significant advantages of pulse regeneration with clock gated logic and relatively inexpensive conversion equipment. Five to 10 msec delay lines with a 2 mc bit-rate accommodate analog signals of up to 8 kc with phase shift below 2 degrees; total dynamic error is within 0.2 % of half scale up to 1 kc. An adaptive filter permits a further trade off of accuracy for bandwidth during computation. This paper describes the design of the delta-sigma modulation systems and presents test results. (Author)

AD-434 544 Div. 30
OTS price $8.10

MSA Research Corp., Callery, Pa.
OPTIMUM PURIFICATION TECHNIQUES FOR THE REMOVAL OF CONTAMINANTS FROM LIQUID LITHIUM AND RUBIDIUM.
Final rept. Feb 63-Jan 64,
by S. J. Rodgers, F. Tepper, W. J. Carter and C. A. Palladino. Mar 64, 83p.
Contract AF33 657 10373, Proj. 8169, Task 816902
APL TDR64 34 Unclassified report

Descriptors: (*Liquid metals, Purification), (*Lithium, Liquid metals), (*Rubidium, Liquid metals), (*Purification, Optimization), Thorium, Contamination, Impurities, Corrosion, Test methods, Test equipment, Alkali metals, Hydrogen, Carbon, Nitrogen, Oxygen, Thermodynamics, Oxides, Uranium, Carbides, Nitrides, Chemical analysis, Titanium alloys, Zirconium alloys, Degasification, Materials, Photomicrography, Yttrium, Zirconium, Titanium, Beryllium.

Techniques of analysis and purification of rubidium and lithium are described. A method for analysis of oxygen in rubidium based on freezing point depression was developed. The technique has a sensitivity of 10 ppm O2 with a precision of ±10 ppm O2. Oxygen was removed from rubidium by stainless steel, zirconium and 50%Zr-50%Ti alloy. The oxygen equilibrium value of rubidium in contact with stainless

steel or zirconium is <10 ppm at 1400 F; with 50%Zr-50%Ti alloy the equilibrium value is <10 ppm at 800 F. (Author)

AD-434 556 Div. 30
OTS price $4.60

Analog/Hybrid Computer Lab., Arizona Univ., Tucson.
A HYBRID ANALOG-DIGITAL PSEUDO-RANDOM NOISE GENERATOR,
by R. L. T. Hampton. Jan 64, 45p.
Grant AF AFOSR89 64
AFOSR 64 0393 Unclassified report

Descriptors: (*Noise generators, Design), (*Computers, Noise generators), Analog-digital computers, Digital systems, Trigger circuits, Statistical functions, Input-output devices.

The design of a hybrid analog-digital pseudo-random noise generator intended to replace conventional random-noise generators in analog and hybrid computer simulating is described. It is capable of producing four essentially uncorrelated binary outputs from a single 25-stage shift-register. The length of the pseudo-random output sequence is 33, 554, 431 bits which is equivalent to several thousand computer runs. (Author)

AD-434 559 Div. 30
OTS price $3.60

Arizona Univ., Tucson.
A HYBRID ANALOG-DIGITAL PARAMETER OPTIMIZER FOR ASTRAC II,
by Baker A. Mitchell, Jr. 16 Jan 64, 37p.
Memo. no. ACL90
Grant AF AFOSR89 64
AFOSR 64 0397 Unclassified report

Descriptors: (*Digital to analog converters, Data storage systems), (*Analog-digital computer, Analysis), Effectiveness, Perturbation theory, Operation, Measurement, Circuits, Computer storage devices, Computer logic, Noise generators.

A new automatic multi-parameter optimizer for iterative differential analyzers employs sequential random parameter perturbation. The nominal parameter point changes whenever the random perturbations inprove the system performance measure. Binary counters operate simple digital-to-analog converters to implement parameter storage, multiplication, and step-size changes. All-digital logic yields different types of random perturbations, viz. simple random walk, random walk with reflecting or absorbing barriers, and various types of correlation over successive perturbations. (Author)

AD-434 670 Div. 30
OTS price $5.60

Ballistic Research Labs., Aberdeen Proving Ground, Md.
BRLESC FORTRAN,
by Lloyd W. Campbell and Glenn Beck. Nov 63, 54p.
Proj. 1M010501A003
BRL 1229 Unclassified report

Descriptors: (*Programming languages, Handbooks), Input-output devices.

This report describes the FORTRAN language in general and includes specific details about its implementation on BRLESC. (Author)

AD-434 675 Div. 30
OTS price $1.60

Nuclide Corp., State College, Pa.
VACUUM VIBRATOR ION SOURCE.
Rept. for 1 Mar 63-28 Feb 64,
by L. A. Cambey. Mar 64, 19p.
Contract AF33 657 11041, Proj. 7360, Task 736005
RTD ML TRD64 75 Unclassified report

Report on the Chemistry and Physics of Materials.

Descriptors: (*Ion sources, Vibrators (Electrical)), (*Vibrators (Electrical), Ion sources), Electric currents, Mass spectroscopy, Spectrum analyzers, Electric potential, Electric arcs, Electrodes, Vacuum apparatus.

Three different vacuum vibrator sources were designed and constructed. These sources were tested on a single focusing mass spectrometer. A preliminary evaluation of the characteristics of the source, including ion current magnitude, ion current stability, and ion energy spread, and their dependence on arc voltage and arc current was carried out. Mass spectra obtained with the single focusing mass spectrometer are presented. (Author)

AD-434 708 Div. 30, 8
OTS price $8.60

Microwave Devices Lab., U. of Utah, Salt Lake City.
(No title).
Consolidated quarterly rept., 1 Oct-31 Dec 63.
31 Dec 63, 98p. TR Q7
Contracts Nonr128805, AF04 647 745, AF33 657 8677
Unclassified report

Descriptors: (*Microwave frequency, Scientific research), Microwave amplifiers, Electron beams, Cyclotron waves, Backward wave oscillators, Millimeter waves, Lasers, Maser's, Plasma medium, Exhaust gases, Superconductivity.

The broad purpose of the research activity reported herein is to extend the useful frequency spectrum into the range from microwave frequencies to optical frequencies and to improve existing devices and techniques in the microwave spectrum. At present this objective is being pursued by studieessss oof electron beam devices, solid state devices, and plasmas. (Author)

AD-434 748 Div. 30
OTS price $15.50

Hughes Dynamics, Inc., Los Angeles, Calif.
METHODOLOGIES FOR SYSTEM DESIGN.
Appendices to final rept.
24 Feb 64, 237p.
Contract AF30 602 2620, Proj. 4594, Task 459 405
RADC TDR63 486A Unclassified report

Appendex.

Descriptors: (*Programming (Computers), Control systems), Programming languages, Control sequences), (*Data processing systems, Design), Input-output devices, Computer logic, Bibliographies, Information retrieval, Mathematical models.

AD-434 749 Div. 30
OTS price $9.10

Hughes Dynamics, Los Angeles, Calif.
METHODOLOGIES FOR SYSTEM DESIGN.
Final rept.

24 Feb 64, 101p.
Contract AF30 602 2620, Proj. 4594, Task 459 405
RADC TDR63 486 Unclassified report

Descriptors: (*Data processing systems, Design), (*Programming (Computers), Control systems), Search theory, Optimization, Control sequences, Computer logic, Information retrieval, Mathematical models.

This report presents the results of work on development, programming, and testing of methodologies for aiding informaion system design and evaluation. They include, (1) a first step in formalization of a calculus of operations developed for aiding definition of processes for file organization and searching, (2) the complete programs for an evaluation and assignment model which provide for mechanized determination of the optimum assignment of components and functions to points in a hierarchial reporting structure, (3) test results on the relative effectiveness (in terms of quality of results and time and cost for the design process) of the measure of system efficiency, the system design model, and the evaluation and assignment programs. (Author)

AD-434 760 Div. 30
OTS price $13.50

Teledyne Systems Corp., Hawthorne, Calif.
AUTOMATIC PROGRAMMING TECHNIQUES (PHASE I).
Final rept.,
by P. Gilbert, J. Hosler and C. Earnest. Feb 64, 191p.
Contract AF30 602 2924, Proj. 5581, Task 558102
RADC TDR63 563 Unclassified report

Descriptors: (*Programming (Computers), Data processing systems), (*Programming languages, Control systems).

The problem of automatic (program) generation of compilers was studied; a compiler generation system was specified, consisting of two parts: a 'generation program' and a 'compiler model'. Using this system, a compiler is generated for a given language in the following manner: An abstract specification of the language is written, using the methods and notation developed in conjunction with the system. This specification is input to the 'generation program', which performs checks on the specification to insure its correctness, and then derives a set of data tables from the specification. (Author)

AD-434 767 Div. 30
OTS price $3.60

Stanford Research Inst., Menlo Park, Calif.
A MATHEMATICAL MODEL OF A TWO-LAYER NETWORK OF THRESHOLD ELEMENTS,
by Donna J. Kaylor. Mar 64, 38p.
Contract AF30 602 2943, Proj. 5581, Task 558104
RADC TDR63 534 Unclassified report

Descriptors: (*Adaptive control systems, Teaching machines), (*Pattern recognition, Artificial intelligence), (*Networks, Mathematical models), Mathematical logic, Determinants.

This paper deals with two facets of the committee problem; i.e., the problem of determining the values of the two sets of weights in a two-layer learning machine consisting of threshold elements to classify correctly a set of patterns into two categories, where the first layer weights are considered committee members and the second layer is considered the committee solution. The first facet involves the existence of a solution committee and the description of various properties of a solution committee. The second facet involves finding an algorithm for locating the members of a solution committee and assigning an evaluation to the vote for each member. As yet, no satisfactory algorithm is known for simultaneously locating committee members and assigning weights to their votes. (Author)

AD-434 768 Div. 30
OTS price $1.60

Rome Air Development Center, Griffiss Air Force Base, N. Y.
CLASSIFIER, AN AUTOMATED COMPUTER-ORIENTED INFORMATION CLASSIFICATION SYSTEM,
by John B. McLean and Edward Morenoff. Feb 64, 17p.
RADC TDR64 14 Unclassified report

Descriptors: (*Machine translation, Classification), Pattern recognition, Information retrieval, Computers, Data processing systems.

CLASSIFIER is an automated computer-oriented information classification system which provides a library structure for information as well as document retrieval. The information content of the document is classified at levels of detail ranging from the document to a sentence. Statistically determined measures of relevance indicative of the degree of association of each unit of information with respect to each class of the hierarchy are defined. The more frequently a word is used in a class, rather than in general usage, the greater the association with that class. Conversely, the less frequencly a word is used in a class, rather than in general usage, the less association with that class. The result is a series of lists of units of information for each class of the hierarchy, rated in order of decreasing relevance. Inherent in the classification process is the ability to select index terms for the units of information to complement the hierarchal structure. Nonstatistical measures can supplement the statistical techniques if desirable. (Author)

AD-434 792 Div. 30
OTS price $6.60

Cambridge Systems Inc., Newton, Mass.
MODIFICATION AND TESTING OF THE TEMPERATURE-HUMIDITY MEASURING SET AN/TMQ-11(A).
Aug 63, 65p.
Contract AF19 628 410, Proj. 6682, Task 668204
AFCRL 63 595 Unclassified report

Descriptors: (*Hygrometers, Design), Dew Point, Temperature, Measurement, Humidity, Tests, Telemeter systems, Calibration, Test methods, Reliability, Maintainability.

This report discusses the engineering design and subsequent modification and testing of the Temperature - Humidity Measuring Set AN/TMQ-11(A), which incorporates a thermoelectric dew point sensing system. All system components and modifications are described in detail. The results of extensive laboratory and field tests for three engineering test models of the AN/TMQ-11(A) are given. (Author)

AD-434 833 Div. 30
OTS price $5.60

Stanford Research Inst., Menlo Park, Calif.
LINK EVALUATION AND TAPE MERGING COMPUTER PROGRAMS.
Final rept.,

by Bruce M. Sifford. Dec 62, 60p. Rept. no. TR7
Contract DA36 039sc85052, SRI Proj. 3340
Unclassified report

Descriptors: (*Programming (Computers), Communication systems), (*Communication systems, Performance (Engineering)), Signal-to-noise ratio, High frequency, Ionospheric propagation, Troposphere, Scattering, Circuits, Input-output devices, Networks, Computer logic, Magnetic tape.

This report is one of a series that describes a computer program designed to predict the performance of communication networks using HF, ionospheric scatter, and tropospheric scatter propagation modes. The present report outlines the models and procedures used to write a computer routine to convert signal-to-noise predictions into a teletype character error rate for a channel and to estimate the usable number of teletype channels the circuit can support. This conversion considers such circuit parameters as teletype speed, teletype code, diversity reception, modulation, and detection techniques. (Author)

AD-434 834 Div. 30
OTS price $13.50

Stanford Research Inst., Menlo Park, Calif.
OUTPUTS FROM THE NETWORK ANALYSIS COMPUTER PROGRAMS: A SUMMARY REPORT.
Final technical rept. no. 3,
by E. M. Young and M. Pollack. Dec 62, 196p.
Contract DA36 039sc85052, SRI Proj. 3340
Unclassified report

Descriptors: (*Programming (Computers), Networks), (*Communication systems, Networks), High frequency, Ionospheric propagation, Scattering, Troposphere, Traffic, Optimization, Performance (Engineering), Scheduling.

Several computer programs have been produced that determine various properties of communication systems. These properties include both the performance of individual transmission links and the performance of an entire network. These computer programs are all designed to operate together. A fairly large sample network is described that demonstrates each of the programs. The outputs of each program, for this sample network, are reproduced in the report. By means of a brief analysis of these results, it is also shown how a network can be evaluated. (Author)

AD-434 844 Div. 30
OTS price $1.60

Research Labs. for the Engineering Sciences, U. of Virginia, Charlottesville.
A MAGNETIC WIND TUNNEL BALANCE,
by H. M. Parker and A. R. Kuhlthau. Feb 64, 20p.
Rept. no. AST 3420 105 64U
Grant AF AFOSR 62 92
AFOSR 64 0567 Unclassified report

Descriptors: (*Wind tunnels, Feasibility studies), Continuum mechanics, Electromagnetic properties, Instrumentation.

A preliminary model of a 3-D wind tunnel balance, which has been constructed and operated in low speed continuum flow for the purpose of demonstrating the feasibility of the approach is described in this report. (Author)

AD-434 895 Div. 30
OTS price $3.60

Cruft Lab., Harvard U., Cambridge, Mass.
AN ADAPTIVE PROCEDURE FOR CONTROLLING UNDEFINED LINEAR PROCESSES,
by K. S. Narendra and D. N. Streeter. 8 Nov 63, 35p. TR 420
Contract Nonr1866 16, Proj. NR372 012
Unclassified report

Descriptors: (*Adaptive control systems, Design), Linear systems, Correlation techniques, Inequalities, Programming (Computers), Performance (Engineering), Simulation, Analysis of variance, Simultaneous equations, Errors, Analysis, Feedback.

An adaptive procedure is described and demonstrated which causes a reduction of the mean-square error of a linear stationary random process, without explicit knowledge of the characteristics of the process. The procedure involves recursive simultaneous adjustment of an arbitrary number of parameters in a feedback compensator. The adjustment is based on estimations of the error gradient in the space of the adjustable parameters. (Author)

AD-434 924 Div. 30
OTS price $2.60

Naval Ordnance Lab., White Oak, Md.
A FORTRAN III (IBM 7090) PROGRAM FOR THE CALCULATION OF THREE-SUBLATTICE MAGNETIZATIONS,
by G. Heiche. 16 Jan 64, 29p.
Task FR30
NOL TR63 32, M35 Unclassified report

Descriptors: (*Programming languages, Magnetic moments), (*Magnetic moments, Programming (Computers)), Temperature, Yttrium, Gadolinium, Iron, Garnet, Rare earths, Crystals, Mathematical analysis, Sequences, Statistical mechanics.

An IBM 7090 program is described. For a given set of molecular field coefficients it calculates the total and partial magnetizations as a function of temperature. It is assumed that the molecular field coefficients vary linearly with temperature. Up to 1000 values can be calculated for each magnetization at equidistant temperatures. A complete listing of the subroutines and an example is included in this report. (Author)

AD-434 979 Div. 30, 5
OTS price $3.60

Watkins-Johnson Co., Palo Alto, Calif.
RADIO INTERFERENCE MEASURING SET AN/URM-100 (XE-1).
Quarterly technical progress rept. no. 2,
26 Sep-25 Dec 63,
by William E. Budd and Marshall H. Hollimon.
25 Dec 63, 37p.
Contract DA36 039AMC02328E, DA Proj. 3B24 01 001 01
Unclassified report

Descriptors: (*Test sets, Radio interference), (*Radio interference, Test sets), Ultrahigh frequency, Superhigh frequency, Interference analyzers, Radiofrequency interference, Mechanical drawings, Measurement, Backward-wave oscillators, Sensitivity, Mixers (Electronic), Tunnel diodes, Distortion, Traveling-wave tubes, Microwave equipment.

The design plan for the AN/URM-100(XE-1) is essentially complete. The areas of microwave subsystem, IF sub-system, and data handling were extensively examined and basic block diagrams were prepared. Development of the stable BWO local oscillator has progressed quite satisfactorily. The present circuit has given the following performance: 0.6% tuning linearity; 10 kc p-p in-

cidental FM; 150 kc hr drift. Sensitivity, linearity and spurious signal generation measurements were made on both a conventional mixer and a tunnel diode mixer, and the results are given. The tunnel diode mixer generates spurious signals at lower input level than the conventional mixer, and has poorer noise figure and sensitivity. The conventional mixer is therefore the choice for this application. Odd order product (IM) measurements were made on an ultra-low noise TWT, and these results are presented. It is shown that mixer fourth order and TWT third order products will be the first spurious responses which will appear as the input power is increased from low levels. (Author)

AD-435 043 Div. 30
OTS price $5.60

Carnegie Inst. of Tech Graduate School of Industrial Administration, Pittsburgh, Pa.
AN ALL-INTEGER INTEGER PROGRAMMING ALGORITHM,
by Fred Glover. Dec 63, 54p. Rept. no. ONR RM 112
Contract Nonr27T024
Unclassified report

Descriptors: (*Linear programming, Optimization), Programming (Computers), Transformations (Mathematics), Control sequences.

AD-435 046 Div. 30
OTS price $3.60

Carnegie Inst. of Tech., Graduate School of Industrial Administration, Pittsburgh, Pa.
A STUDY OF THE ALL-INTEGER, INTEGER PROGRAMMING ALGORITHM,
by Fred Glover. Sep 63, 38p. Rept. no. ONR RM116
Contract Nonr23000
Unclassified report

Descriptors: (*Linear programming, Scheduling), Recursive functions, Decision theory, Programming (Computers), Transformations (Mathematics).

The integer programming algorithm is expanded in two ways: by developing and testing rules for selecting pivotal constraints, and by introducing two methods for boosting the problem toward solution before the pivot rules are applied. (Author)

AD-435 055 Div. 30, 6
OTS price $8.60

Bergen Research Engineering Corp., Teterboro, N. J.
OLS STABILIZATION EQUIPMENT MODEL 36M2 OPERATING INSTRUCTION MANUAL,
by W. H. Schwab. June 62, 98p. Rept. no. 3601 R6
Contract N156 36752
Unclassified report

Descriptors: (*Stabilization systems, Design), (*Radar range computer, Stabilization), Signals, Position finding, Aircraft, Operation, Specifications, Actuators, Control, Tests.

AD-435 073 Div. 30
OTS price $12.00

IIT Research Inst., Chicago, Ill.
DEVELOPMENT OF STANDARD CALIBRATION PROCEDURE FOR INTERFERENCE MEASURING INSTRUMENTS.
Final rept. 1 Feb 58-31 Aug 60.
31 Aug 60, 168p.
Contract NObsr72748, ARF Proj. E097
Unclassified report

Descriptors: (*Test equipment (Electronics), Radiofrequency interference), Naval equipment, Calibration, Electric bridges, Bolometers, Thermistors, Errors, Measurement, Sensitivity, Stability, Measuring devices (Electrical and Electronic), Circuits, Test methods.

This report describes the work performed (1) to develop a standard procedure for calibration of Navy interference measuring equipments from 14 kc. to 1000 mc., and (2) to furnish a working model of an instrument capable of performing the standard calibrations. A procedure has been developed for the calibration of interference measuring equipments from 100 microvolts to 100 mv. rms, over the frequency range from 14 kc. to 1000 mc. The procedure employs a d.c. thermistor bridge in conjunction with a coaxial attenuation circuit. A working model of such a calibration instrument has been designed, constructed, and tested. This report presents detailed discussion concerning the design and theory of operation of the calibration instrument. The discussion is supplemented by pertinent drawings, photographs, schematic diagrams, and theoretical and experimental curves. Pertaining to the utilizaton and construction of the RF calibration instrument, the report includes: (1) Complete, concise instructions for the effective operation of the instrument in performing the calibration of Navy interference measuring instruments; (2) Photographs and sketches showing the constructon of components, and the assemblage of parts and materials into a working model; and (3) Lists of parts required for the construction of the calibration instrument and ancilliary equipments required for the calibration procedure. (Author)

AD-435 083 Div. 30
OTS price $2.60

Stelma, Inc., Stamford, Conn.
DEVELOPMENT OF (PCM) DATA BUFFERS.
Quarterly progress rept. no. 2, 24 Oct 63-20 Jan 64,
by M. Van Vlack. 20 Jan 64, 25p.
Contract DA36 039AMC03186E, Proj. DA36 039AMC
Unclassified report

Descriptors: (*Data transmission systems, Digital systems), Input-output devices, Multiplex, Design, Computer logic, Timing circuits.

The design and construction of two advanced development models of a low-speed and a high-speed converter (PCM Buffer), digital-to-digital -- each for inserting a number of digital data channels into Data I or Data II of the PCM Multiplexers TD-352( )/U or TD-353( )/U, to the PCM Multiplexers. (Author)

31. SHIPS AND MARINE EQUIPMENT

AD-433 639 Div. 31
OTS price $1.60

Naval Boiler and Turbine Lab., Philadelphia, Pa.
EVALUATION OF THOMAS A. EDISON INDUSTRIES FLAME FAILURE ALARM UNIT,
by W. F. Reidenbach. 25 Feb 64, 14p.
Projs. B569, F013 08 12, Task 4203
Unclassified report

Descriptors: (*Ultraviolet detectors, Boilers), Flames, Detectors, Shock resistance, Vibration, Environmental tests, Performance (Engineering), Acceptability, Flameout.

Two flame failure detection devices, Models 459 and 461, were evaluated for ability to withstand shock and vibration in accordance with Specification MIL-S-901 and Standard MIL-STD-167. An additional investigation was conducted to insure compatibility of the devices with existing naval equipment. Both units are considered satisfactory within the area and standard tested. (Author)

AD-433 795 Div. 31
OTS price $1.60

David Taylor Model Basin, Washington, D. C.
STARSHINE PROGRAM FOR STORAGE, RETRIEVAL, AND ANALYSIS OF SHOCK-DAMAGE INFORMATION,
by Ronald E. Baker and Natalie T. Goldberg.
Dec 63, 19p.
Proj. SF013 10 02, Task 1799
DTMB 1782 Unclassified report

Descriptors: (*Underwater explosions, Damage control), (*Naval equipment, Malfunctions), (*Information retrieval, Computers).

As the result of a program of shock hardening and underwater explosion shock tests on operating ships authorized by the Chief of Naval Operations, large quantities of information are being accumulated on shock damage to and malfunctioning of equipment, and on the circumstances under which these occur. A system for storing, collating, and analyzing these data is essential to their effective utilization to improve the Fleet by increasing the reliability of vital equipment and to evaluate the effectiveness of the shock-hardening program itself. Program STARSHINE, which utilizes the LARC computer, was devised to meet this need. This report describes the program and its use. (Author)

AD-433 858 Div. 31
OTS price $2.60

Naval Boiler and Turbine Lab., Philadelphia, Pa.
INVESTIGATION OF 70-30 COPPER-NICKEL CATAPULT TROUGH HEATER TUBING,
by D. G. Hansen. 25 Mar 64, 22p.
NBTL ETR B571 Unclassified report

Descriptors: (*Catapults, Heating elements), (*Heating elements, Catapults), (*Aircraft carriers, Catapults), Pipes, Pipe fittings, Degradation, Temperature, Shipborne, Simulation, Operation, Metals, Steam, Condensation, Erosion.

Aircraft carrier catapult trough heater tubing was tested at the Laboratory to determine the effect of inlet steam temperature on rate of tube wall deterioration. It was found that as long as the catapult trough heater was condensing all the steam that entered it, the trough heater tube metal temperature would not exceed saturation temperature. The process involved in tube wall deterioration is erosion. Simulation of shipboard operation in the Laboratory is difficult and costly so further investigations should be made on shipboard. Condensate traps on shipboard should be checked regularly for proper operation. (Author)

AD-433 896 Div. 31
OTS price $2.60

Naval Research Lab., Washington, D. C.
SUBMARINE ATMOSPHERE STUDIES ABOARD USS SCULPIN, Interim rept.,
by M. E. Umstead, W. D. Smith and J. E. Johnson.
27 Feb 64, 27p.
Projs. SF013 08 03, SP89422
NRL 6074 Unclassified report

Descriptors: (*Submarines, Confined environments), (*Nuclear-powered vessels, Controlled atmospheres), (*Controlled atmospheres, Nuclear-powered vessels), Contamination, Hydrocarbons, Chromatographic analysis, Chlorine compounds, Fluorine compounds, Halogenated hydrocarbons, Atmospheric pollution, Air, Purification.

Studies of the organic contaminants in the atmosphere of USS SCULPIN were made during a submerged cruise. Detailed analyses were made of the concentrations of methane, Freon-12, and total hydrocarbons by means of a backflush gas chromatograph of new design. The effectiveness of the CO/H2 burners and main carbon bed as removal agents for organic contaminants was included in the studies. The CO/H2 burners satisfactorily burned organic contaminants at temperatures as low as 500 F. The active carbon in the main filter bed removed the higher hydrocarbons, but was not very effective for the removal of lower hydrocarbons and Freon-12. Based on experimental data obtained on shipboard, it was calculated that the rate of generation of organic vapor contaminants was about 1.5 lbs. per day throughout the cruise. (Author)

AD-434 142 Div. 31, 9
OTS price $1.60

David Taylor Model Basin, Washington, D. C.
EFFECTS OF LONGITUDINAL BOTTOM SPRAY STRIPS ON PLANING BOAT RESISTANCE,
by Eugene P. Clement. Feb 64, 17p.
Proj. S F014 02 02
DTMB 1818 Unclassified report

Descriptors: (*Ship hulls, Hydrodynamic configurations), (*Planing surfaces, Ship models), Tests, Fluid flow, Velocity, Stagnation point.

Experiments were made to determine the effects on planing boat resistance of several configurations of longitudinal bottom spray strips. It was found that such strips extending aft from the bow about 70% of the hull length decreased the resistance somewhat at high speed but increased the resistance at low speed. The performance was noticeably improved by sharpening the edges of the spray strips. An experiment was also made with bottom spray strips extending only forward of the high-speed stagnation line. This arrangement gave a 6% reduction in resistance at high speed with no increase in resistance at low speed. (Author)

AD-434 185 Div. 31, 9
OTS price $4.60

David Taylor Model Basin, Washington, D. C.
CAVITATION PERFORMANCE OF PROPELLERS IN A

SUBMARINE WAKE,
by Willard H. Roundy, Sr. and James G. Peck.
Jan 59, 42p.
DTMB 1296 Unclassified report

Descriptors: (*Propellers (Marine), Submarines), (*Submarines, Propellers), (*Cavitation, Performance (Engineering)), (*Model tests, Model basins), Noise, Velocity, Thrust, Torque, Pressure.

This report presents the results of the evaluation of three model propellers tested in the 24-in. Water Tunnel with a simulated wake of a representative submarine in order to determine the cavitation characteristics. Curves are also presented for the inception of cavitation along the radius as a function of the operating conditions. (Author)

AD-434 288 Div. 31
OTS price $1.60

David Taylor Model Basin, Washington, D.C.
OPEN-WATER AND CAVITATION PERFORMANCE OF THE PROPELLER FOR SARGO SS(N)583,
by W. H. Roundy. Feb 64, 12p.
Proj. S F013 07 09
DTMB 1816 Unclassified report

Descriptors: (*Propellers (Marine), Submarines), (*Cavitation, Propellers (Marine)), Tests, Nuclear-powered vessels, Performance (Engineering), Fluid dynamic properties, Experimental data, Velocity, Model tests.

Test results are given for the predicted cavitation performance in uniform inflow of the propellers designed for SS(N)583. These results are shown as inception curves of face, back, and tip vortex cavitation at each design radius of the propeller. Openwater and cavitation characteristic curves are also included. (Author)

AD-434 291 Div. 31
OTS price $1.60

David Taylor Model Basin, Washington, D.C.
POWERING CHARACTERISTICS OBTAINED WITH VERTICAL AXIS PROPELLERS FOR LUC(A) REPRESENTED BY MODEL 4952-1,
by Mary C. Dickerson. Feb 64, 12p.
Proj. S F013 02 04
DTMB 1753 3 Unclassified report

Descriptors: (*Ship hulls, Landing craft), Design, Ship models, Propellers (Marine), Model tets, Configuration.

Powering tests, including investigation of bollard pull capabilities, were conducted on model 4952-1, a modified version of model 4952. This model represented the Utility Landing Craft, Assault LCU(A) FY 1963. The stern lines of model 4952 were altered by dropping the chine, making a flatter bottom, and moving the propellers 2 inches inboard. The altered stern lines resulted in a 3 percent increase in ehp at 8 knots and a 15 percent increase in shp at 8 knots. The alterations also greatly improved the bollard pull astern capabilities. (Author)

AD-434 328 Div. 31
OTS price $15.50

Materials and Chemical Labs., Boston Naval Shipyard, Mass.
COLLECTION OF REPORTS ON VIBRATION SURVEYS,
by G. Capano. 1963, 230p.
Unclassified report

Descriptors: (*Vibration, Ship structural components), (*Ship structural components, Vibration), Reports, Ship hulls, Shafts, Feed pumps, Compressors, Ship auxiliary equipment, Turbine parts, Generators, Naval research.

AD-434 581 Div. 31
OTS price $1.60

David Taylor Model Basin, Washington, D.C.
PROPULSION CHARACTERISTICS OBTAINED WITH VERTICAL AXIS PROPELLERS FOR LCU (A) REPRESENTED BY MODEL 4952,
by Mary C. Dickerson. Feb 64, 15p.
Proj. S F013 02 04
DTMB 1753 2 Unclassified report

Descriptors: (*Landing craft, Propellers (Marine)), (*Propellers (Marine), Landing craft), Propulsion, Tests, Model tests, Ship hulls, Maneuverability, Fluid flow, Hydrodynamic configurations.

Propulsion tests, including investigation of bollard pull capabilities, were conducted on Model 4952 representing the Utility Landing Craft, Assault LCU(A) FY 1963. The craft is propelled by two vertical axis propellers with an installed horsepower of 680. As a result of the poor propeller performance due to air drawing in the bollard pull astern tests, it is recommended that the stern lines be altered. (Author)

AD-434 701 Div. 31
OTS price $15.50

Electric Boat Div. General Dynamics Corp., Groton, Conn.
SUBMARINE SEA-CONNECTED PUMPING SYSTEM NOISE REDUCTION STUDY - PHASE I,
by D. S. McManus. Aug 63, 237p. Rept. no. U411 63 047
Contract NObs86896, Proj. SF013 11 15, Task 3963
Unclassified report

Descriptors: (*Marine engineering, Underwater sound), (*Pumps, Submarine noise), Submarine hulls, Water tanks, Noise, Sea water, Pipes, Vacuum pumps, Design, Handbooks, Sound transmission, Hydraulic models, Hydraulic pressure pumps, Fluid flow, Recuction.

This manual presents the results of an analytical and experimental investigation to determine necessary criteria for the sesign of quiet sea-connected piping systems. The work accomplished may be summarized as follows: (1) Some general design guidelines are suggested. A procedure for calculating the radiation spectrum of fluidborne noise from the pump noise spectrum was developed. The method of estimating sound radiation due to pump vibration transmitted through the piping system structures to the sea chest and hull plating was demonstrated. A sea chest simulator experimental test loop was designed, constructed, and utilized. The experimental results can be used to modify the theoretical sound transmission transfer functions which were analytically determined for a number of pipe element configurations. (Author)

AD-434 703 Div. 31
OTS price $1.60

David Taylor Model Basin, Washington, D. C.
RESISTANCE CHARACTERISTICS OBTAINED WITH VERTICAL

AXIS PROPELLERS FOR LCU(A) REPRESENTED BY MODEL 4952,
by Mary C. Dickerson. Feb 64, 11p.
Proj. S F013 02 04
DTMB 1753 Unclassified report

Descriptors: (*Propellers (Marine), Landing craft), (*Landing craft, Propellers (Marine)), (*Ship hulls, Landing craft), Hydrodynamic configurations, Power, Drag, Hydrodynamics, Tests, Model tests.

Resistance tests were conducted on Model 4952 representing the Utility Landing Craft, Assault LCU(A) FY 1963. The craft is propelled by two four-bladed vertical axis propellers with an installed shaft horsepower of 680. The tests were conducted at the landing condition with bare hull and with two skeg arrangements. Resistance data were also obtained at the light condition with a large skeg, Scheme II, on the model. (The Scheme II skeg is the arrangeyment planned for use on the ship.) The effective horsepower required per ton is lower for new design LCU(A) throughout the entire speed range than for the LCU 1466 Class. (Author)

AD-435 058 Div. 31
OTS price $8.10

David Taylor Model Basin, Washington, D. C.
SHIPBOARD VIBRATION RESEARCH IN THE U.S.A. A REPORT TO THE VIBRATION COMMITTEE (9) OF THE 2ND INTERNATIONAL SHIP STRUCTURES CONGRESS IN DELFT, 20-24, JULY 1964,
by E. F. Noonan. 1964, 81p.
Unclassified report

Descriptors: (*Ships, Vibration), (*Vibration, Ships), Ship hulls, Theory, Flexible structures, Computers, Ship structural components, Rotation, Configuration, Flutter, Hydrodynamics, Damping, Propellers (Marine), Excitation, Analysis, Design.

32. MISCELLANEOUS ARTS AND SCIENCES

AD-433 512 Div. 32
OTS price $1.60

System Development Corp., Santa Monica, Calif.
SOCIAL VALUE AND TECHNOLOGICAL DESIGN,
by Ramon J. Rhine. 6 Jan 64, 19p. Rept. no. SP1506
Unclassified report

Descriptors: (*Sociology, Engineering), (*Management engineering, Public opinion).

The place of value in a world of fact has come almost guiltily to center stage with the invention of The Bomb. It is highlighted further by such consequences of automation as unemployment. Yet, we live in a time where there sometimes seems to be little common ground between the values of the humanities on the one hand and science and technology on the other. C.P. Snow (1961), among others, has dramatized the apparent lack of understanding between scientists and those trained in the humanities. There is an uneasy feeling that, as the popular prestige of technology grows, the gap widens between humanistic values and modern life; warm human values seem crowded into a corner by the cold values of speed and efficiency. (Author)

AD-433 648 Div. 32, 15
OTS price $1.60

Lisbon Univ. (Portugal).
TECHNIQUES FOR ECONOMIC CONTROL CHART OPERATION,
by J. Tiago de Oliveira and Sebastian B. Littauer. 1963, 19p.
Contract Nonr266 04
Unclassified report

In cooperation with Columbia Univ., New York.

Descriptors: (*Statistical processes, Economics), (*Industrial production, Control systems), Sampling, Cost, Factor analysis, Quality control, Probability.

AD-433 783 Div. 32
OTS price $6.60

Institute for Defense Analyses, Washington, D. C.
BIBLIOGRAPHY OF VIET-NAM,
by Joseph Coates. Jan 64, 61p. Internal note N100; 641 2253
Unclassified report

Descriptors: (*Bibliographies, Social science), (*Social science, Bibliographies), Geography, History, Culture, Economics, Agriculture, Labor, Public health, Political science, Armed Forces (Foreign).

AD-433 851 Div. 32
OTS price $1.10

RAND Corp., Santa Monica, Calif.
EFFECTS OF INFLATION ON THE COMPOSITION OF THE MONEY SUPPLY,
by Kenneth L. Deavers. Mar 64, 10p. Rept. no. P2883
Unclassified report

Descriptors: (*Money, Economics), (*Economics, Banking), (*Banking, Money), Theory, Costs, Wages, Errors, Tables.

AD-433 852 Div. 32, 12
OTS price $1.60

RAND Corp., Santa Monica, Calif.
A DISCUSSION OF SPACE PROGRAM COSTS,
by David Novick. Feb 64, 12p. Rept. no. P2858
Unclassified report

Paper presented at a Princeton Univ. conference 'The Space Program: Cost and Payoff', 20 Feb 64.

Descriptors: (*Research program administration, Costs), (*Costs, Scientific research), Lunar bases, Manned spacecraft.

AD-433 967 Div. 32
OTS price $2.60

RAND Corp., Santa Monica, Calif.
ON THE TRAIL OF CHOU EN-LAI IN AFRICA,
by Robert A. Scalapino. Apr 64, 28p. Rept. no. RM4061PR
Contract AF49 638 700
Unclassified report

Descriptors: (*Communists, Leadership), (*Political science, Communism), Propaganda, Economics, Foreign policy, Verbal behavior, Speech.

AD-434 030 Div. 32
OTS price $2.60

RAND Corp., Santa Monica, Calif.
POLITICAL RESEARCH ON CONTEMPORARY CHINA: SOME PROBLEMS AND OPPORTUNITIES,
by William F. Dorrill. Apr 64, 27p. Rept. no. P2896
Unclassified report

Descriptors: (*Political science, Data), (*Communists, Political science), Economics, Analysis, Population, Social science, Industrial production, Wages, Education, Psychology, Criminology.

AD-434 056 Div. 32, 23
OTS price $2.60

Human Resources Research Office, George Washington U., Washington, D. C.
SOME LANGUAGE ASPECTS OF THE U. S. ADVISORY ROLE IN SOUTH VIETNAM,
by Alfred I. Fiks and John W. McCrary. Nov 63, 30p.
Unclassified report

Descriptors: (*Language, Social science), Sociology, Verbal behavior, Personnel, Social communication, Military personnel, Test methods, Tables, Armed forces (Foreign), Armed forces (United States), Political science, Geography.

This paper presents certain information regarding the role and verbal communication problems of the U. S. military in a strategic geopolitical area. The data come from a group of United States Army officers who had served tours of duty in South Vietnam. The survey yielding the data was conducted as part of a project aimed at developing a short, programmed course to enhance the Vietnamese language capability of U. S. Armed Forces personnel. It was deemed desirable in said project ot have the course content based on an empirical determination of actual language needs. The present paper summarizes the findings of the content generation survey which was conducted to assess these needs. The survey was carried out as a best available approximation to on-the-spot observation of actual U. S. - Vietnamese interpersonal communication requirements The information to be described falls into five subject-matter areas, viz: (1) length and character of duty assignments; (2) methods of communication between U. S. advisors and their Vietnamese counterparts; (3) the improtance of language problems; (4) critical verbal communication incidents; and (5) non-duty contacts with Vietnamese nationals. (Author)

AD-434 070 Div. 32
OTS price $11.00

Conquest (Robert), London (England).
THE SOVIET SUCCESSION PROBLEM.
Final rept.,
by Robert Conquest. 3 Mar 64, 141p.
Contract N62558 3609
Unclassified report

Descriptors: (*Political science, USSR), Economics, Leadership, Communists, Military organizations, Foreign policy, Government (Foreign), China, Communism.

AD-434 255 Div. 32, 5, 12, 25
OTS price $1.10

Aerospace Corp., Los Angeles, Calif.
PROFESSIONAL PAPERS CLEARED FOR POSSIBLE PUBLICATION AND/OR PRESENTATION.
Rept. for 16 Feb-15 Mar 64,
by Frances A. Brady. 31 Mar 64, 5p. Rept. no. CSR269 9990PP9
Contract AF04 695 269
Unclassified report

Descriptors: (*Scientific research, Military publications), (*Bibliography, Military publications), Physics, Communication systems, Guided missiles.

AD-434 500 Div. 32, 30
OTS price $6.60

Hudson Inst., Harmon-on-Hudson, N. Y.
STUDY FOR HYPOTHETICAL NARRATIVES FOR USE IN COMMAND AND CONTROL SYSTEMS PLANNING. VOLUME I. PROFILES OF THE FUTURE.
Final rept., 1 Sep 62-31 Aug 63,
by Francis Armbruster, Joanna Burnstine, Andrew Caranfil, Thomas Cattell and Nancy de Janosi.
Sep 63, 64p. Rept. no. HI285RR
Contract AF19 628 1676, Proj. 5101
ESD TDR64 178, vol. 1 Unclassified report

Descriptors: (*Foreign policy, Command and control systems), Sociometrics, Game theory, Models (Simulation), Mathematical prediction, Political science.

This Report presents four techniques for the systematic simulation of possible future environments within which United States command and control systems may be called upon to operate. The Report contains: (1) Twenty-three Future Worlds, or total environments, designed for use as scenario contexts; (2) 40 detailed Alternate Area Projections, for the Soviet Union, Western Europe, China, Japan, South Asia, Middle East and North Africa, Southeast Asia, Latin America, and Sub-Saharan Africa, designed as war-gaming constraints and usable in an extensive series of combinations; (3) the Extended AREA Projection, a systematic method for deriving the possible detailed character of future diplomatic and strategic actors, in this case the U.S.S.R. for 1965, 1970, and 1975; and (4) the Alternative National Policy Card Deck, a propaedeutic device for devising possible United States policies to interact with the environments generated by methods (1), (2), and (3) above. (Author)

AD-434 817 Div. 32
OTS price $1.60

Rand Corp., Santa Monica, Calif.
TRENDS IN CONSUMPTION IN THE SOVIET UNION,
by Janet G. Chapman. Mar 64, 11p. Rept. no. P 2888
Unclassified report

Descriptors: (*Commerce, Analysis), (*Economics, Industrial production), Government procurement, History, Growth, Production, Housing, Urban areas, Population, Leadership, Food.

AD-435 019 Div. 32, 30
OTS price $19.75

Aerospace Information Div., Washington, D. C.
FUTURE TRENDS IN SOVIET SCIENCE AND TECHNOLOGY. REVIEW OF SOVIET LITERATURE.
23 Jan 64, 308p.
AID P64 6;4 Unclassified report

Descriptors: (*Reviews, Scientific research), (*Reports, USSR), (*Military publication, USSR), Education, Aeronautics, Scientific research, Space flight, Automation, Electronics, Economics, Symposia, Cybernetics, Armed Forces (Foreign), Warfare, Social science, Political science, War potential, Military requirements, Foreign policy, National defense.

33. TRANSPORTATION

AD-433 535 Div. 33, 1
OTS price $1.10

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
AIRCRAFT TODAY--SPACECRAFT TOMORROW,
by N. Krutov. 11 Feb 64, 10p.
FTD TT63 1134 Unclassified report

Trans. from Grazhdanskaya Aviatsiya, No. 7, pp. 18-19, 1963.

Descriptors: (*Air transportation, Commercial planes), (*Aerospace craft, Rocket planes), (*Rocket planes, Air transportation), Cargo, Supersonic planes, High altitude, Airplane landings, Aviation safety, Weight, Circular orbit trajectones, Airspeed, Space stations, Human engineering, Spacecraft cabins, Adaptive control systems, Design, Spaceborne, Flight control systems, Interplanetary trajectories.

AD-434 913 Div. 33, 26
OTS price $8.60

Federal Aviation Agency, Washington, D. C.
AIRPORTS AND HELIPORTS: PLANNING, MANAGEMENT AND OPERATIONS, SAFETY. SELECTED REFERENCES.
Dec 63, 96p. Rept. no. BL10
Unclassified report

Descriptors: (*Airports, Bibliographies), (*Management engineering, Airports), Management planning, Traffic, Noise, Site selection, Costs, Safety, Helicopters.

This bibliography is a partially annotated compilation of selected references with international coverage from 1959 to date.

SUBJECT INDEX

ABLATION
BLUNT BODIES
CONCERNING THE INFLUENCE OF RADIATION HEAT EXCHANGE ON THE REMOVAL OF SUBSTANCE IN THE CRITICAL POINT OF A BLUNT-NOSED BODY,
AD-434 963 DIV. 9

ABSORPTION SPECTRUM
AROMATIC COMPOUNDS
RESEARCH ON TRIPLET STATES AND PHOTOCHROMISM,
AD-434 239 DIV. 4

ABSORPTION (BIOLOGICAL)
SKIN
BASIC STUDIES IN PERCUTANEOUS ABSORPTION,
AD-434 459 DIV. 16

ABSTRACTS
DENTISTRY
ABSTRACTS OF RESEARCH REPORTS OF PROJECTS COM- PLETED IN PARTIAL FULFILLMENT OF REQUIREMENTS OF THE GENERAL POSTGRADUATE COURSE,
AD-433 628 DIV. 16

ABSTRACTS
MEDICINES
SELECTED ABSTRACTS FROM SOVIET BIOMEDICAL JOURNALS, NO, 3, SERIES 2,
AD-434 278 DIV. 16

ABSTRACTS
RADIATION DAMAGE
MONTHLY ACCESSION LIST, ABSTRACT NO. 22919 TO 23001, PART 1,
AD-434 600 DIV. 14

ABSTRACTS
SPECTROSCOPY
DETECTION OF THE TRIPLET STATE BY EPR AND OTHER METHODS, COMPILATION OF ABSTRACTS BASED ON SOVIET OPEN LITERATURE,
AD-434 712 DIV. 23

ACCLIMATIZATION
MICE
THE EFFECT OF ZYMOSAN AND ENDOTOXIN TREATMENT ON EXPERIMENT AL COXSACKIE B VIRUS INFECTION,
AD-434 082 DIV. 16

ACOUSTICS
ATMOSPHERE
CHARACTERISTICS OF ACOUSTIC ATMOSPHERES,
AD-434 384 DIV. 2

ADAPTIVE CONTROL SYSTEMS
BIBLIOGRAPHIES
ADAPTIVE CONTROL SYSTEMS: AN ANNOTATED BIBLIOGRAPHY,
AD-433 807 DIV. 30

ADAPTIVE CONTROL SYSTEMS
DESIGN
AN ADAPTIVE PROCEDURE FOR CONTROL- LING UNDEFINED LINEAR PROCESSES,
AD-434 895 DIV. 30

ADAPTIVE CONTROL SYSTEMS
TEACHING MACHINES
A MATHEMATICAL MODEL OF A TWO-LAYER NETWORK OF THRESHOLD ELEMENTS,
AD-434 767 DIV. 30

ADSORPTION
GASES
GAS ADSORPTION ON AN ORGANIC SURFACE: HMX,
AD-434 285 DIV. 4
ADSORPTION - DESORPTION PROPERTIES OF SORBENTS,
AD-434 980 DIV. 4

ADSORPTION
LUBRICANT ADDITIVES
SURFACE CHEMISTRY OF SOME LUBRICANT ADDITIVES,
AD-434 204 DIV. 14

AERIAL CAMERAS
CAMERA SHUTTERS
A PULSE OPERATED SHUTTER SYSTEM FOR AN AERIAL CAMERA WITH CELESTIAL ORIENTATION,
AD-433 779 DIV. 24

AERIAL CAMERAS
LOW ALTITUDE
TEST AND EVALUATION OF TA- 7H CAMERA MANUFACTURED BY AEROJET DELFT CORPORATION,
AD-433 801 DIV. 24

AERIAL CAMERAS
OPTICAL PROPERTIES
THE ASTROGRAPHIC ACCURACY OF A RECONNAISSANCE CAMERA,
AD-434 400 DIV. 24

AERIAL TARGETS
ATTACHMENT
STRENGTH ANALYSIS OF THE NAVAIRDEVCEN C.G. TARGET LAUNCHER,
AD-434 302 DIV. 1

AERIAL TARGETS
TARGET DRONES
EVALUATION OF THE COMPATIBILITY OF THE AQM-37A TARGET, LAU-24/A LAUNCHER, AND A- 4B LAUNCH AIRCRAFT,
AD-433 591 DIV. 22

AEROELASTICITY
HYDROFOILS
A STUDY IN UNDERWATER FLUTTER,
AD-435 061 DIV. 9

AEROELASTICITY
MATHEMATICAL ANALYSIS
INVESTIGATION OF COMPLEX NATURAL FREQUENCIES OF FLEXIBLE AIRCRAFT DEPENDING ON SPEED OF FLIGHT,
AD-434 994 DIV. 9

AEROELASTICITY
SYMPOSIA
PROCEEDINGS OF SYMPOSIUM ON AEROELASTIC AND DYNAMIC MODELING TECHNOLOGY, 23 24 25 SEPTEMBER 1963, DAYTON, OHIO,
AD-434 797 DIV. 9

AEROSOLS
DIFFUSION
THE FLUORESCENT PARTICLE ATMOSPHERIC TRACER,
AD-434 169 DIV. 3

AEROSOLS
FLAMMABILITY
INVESTIGATION OF THE FLASHING OF AEROSOLS,
AD-433 712 DIV. 3

AEROSPACE CRAFT
DETECTION
AEROSPACE VEHICLE DETECTION STUDIES,
AD-433 859 DIV. 6

AEROSPACE CRAFT
ROCKET PLANES
AIRCRAFT TODAY--SPACECRAFT TOMORROW,
AD-433 535 DIV. 33

AEROSPACE PLANES
DETECTION
AEROSPACE VEHICLE DETECTION STUDIES,
AD-433 859 DIV. 6

AGING (MATERIALS)
MEASUREMENT
QUARTZ CRYSTAL AGING EFFECTS,
AD-434 674 DIV. 8

AIR
TRANSPORT PROPERTIES
TRANSPORT PROPERTIES OF NITROGEN, HYDROGEN, OXY- GEN, AND AIR TO 30,000 K,
AD-435 053 DIV. 2

AIR MASS ANALYSIS
ANTICYCLONES
THE SYNOPTIC CLIMATOLOGY OF CLOUD-FREE AREAS,
AD-433 504 DIV. 2

AIR MASS ANALYSIS
ATMOSPHERE MODELS
ON THE BEHAVIOUR OF DISTURBANCES IN A BAROCLINIC CHANNEL,
AD-434 566 DIV. 2

AIR MASS ANALYSIS
CLIMATOLOGY
THE SYNOPTIC CLIMATOLOGY OF CLOUD-FREE AREAS,
AD-433 503 DIV. 2

AIR MASS ANALYSIS
POLAR REGIONS
PECULIARITIES OF OPTICAL CHARACTERISTICS OF ARCTIC MASSES OF AIR,
AD-434 938 DIV. 2

AIR TRANSPORTATION
COMMERCIAL PLANES
AIRCRAFT TODAY--SPACECRAFT TOMORROW,
AD-433 535 DIV. 33

AIRCRAFT CARRIERS
CATAPULTS
INVESTIGATION OF 70-30 COPPER- NICKEL CATAPULT TROUGH HEATER TUBING,
AD-433 858 DIV. 31

AIRCRAFT FINISHES
PROTECTIVE TREATMENTS
THE DEVELOPMENT OF A NEW TYPE MASKING COMPOSITION FOR O+R OPERATIONS,
AD-434 183 DIV. 1

AIRCRAFT FIRES
NUCLEAR WEAPONS
AN ANALYSIS OF THE TEMPERATURE- TIME DATA OBTAINED FROM A STEEL CYLINDER ENGULFED BY AN AIRCRAFT- FUEL FIRE,
AD-434 800 DIV. 1

AIRFRAMES
DEFORMATION
CH-21A HELICOPTER AIRFRAME DEFORMATION UNDER A DYNAMIC CRASH CONDITION,
AD-433 683 DIV. 1

AIRFRAMES
HELICOPTERS
STATIC TEST PROGRAM FOR CH-47A HELICOPTER,
AD-433 586 DIV. 1

AIRFRAMES
VIBRATION
INVESTIGATION OF COMPLEX NATURAL FREQUENCIES OF FLEXIBLE AIRCRAFT DEPENDING ON SPEED OF FLIGHT,
AD-434 994 DIV. 9

AIRPORTS
BIBLIOGRAPHIES
AIRPORTS AND HELIPORTS: PLANNING, MANAGEMENT AND OPERATIONS, SAFETY, SELECTED REFERENCES,
AD-434 913 DIV. 33

ALBEDO
NEUTRONS
DEPENDENCE OF NEUTRON ALBEDOS UPON HYDROGEN CONTENT OF A SHIELD,
AD-433 735 DIV. 20

ALDEHYDES
MICROWAVE SPECTROSCOPY
THE MICROWAVE SPECTRUM OF PROPIONALDEHYDE,
AD-434 347 DIV. 23

ALGAE
GROWTH SUBSTANCES
ACTION OF GIBBERELLIC ACID ON PROTOCOCCALES,
AD-434 937 DIV. 16

ALGEBRAIC TOPOLOGY
SEQUENCES
AN APPROXIMATION THEOREM,
AD-433 607 DIV. 18

ALGEBRAS
GROUPS (MATHEMATICS)
LATTICE-ORDERED SEMIGROUPS, GRAPHS AND AUTOMATA,
AD-433 946 DIV. 18

ALGEBRAS
THEORY
ON THE THEORY OF BOOLEAN FORMULAS: MINIMAL INCLUDING SUMS, I,
AD-433 595 DIV. 18
ON THE THEORY OF BOOLEAN FORMULAS: MINIMAL INCLUDING SUMS, II,
AD-433 599 DIV. 18

ALKALINE CELLS
DESIGN
DESIGN, FABRICATION AND TESTING OF VENTED, RECHARGEABLE SILVER-CADMIUM CELLS,
AD-434 061 DIV. 7

ALKYNES
POLYMERIZATION
SYNTHESIS AND EVALUATION OF POLYMERS WITH SPECIAL PROPERTIES,
AD-434 229 DIV. 4

ALLOYS
EUTECTICS
DIAGRAM OF FUSIBILITY OF THE SYSTEM NI-CR-NIAL,
AD-434 974 DIV. 17

ALLOYS
RADIATION DAMAGE
EFFECT OF HIGH THERMAL RADIATION FLUX ON SEVERAL METAL ALLOYS,
AD-434 448 DIV. 17

ALUMINUM ALLOYS
ADDITIVES
MINOR ALLOY ADDITIONS TO ALUMINUM ALLOY MELTS,
AD-434 214 DIV. 17

ALUMINUM ALLOYS
CORROSION
INVESTIGATION OF THE MECHANISM OF STRESS CORRO- SION OF ALUMINUM ALLOYS,
AD-434 234 DIV. 17

ALUMINUM ALLOYS
FRACTOGRAPHY
A REVIEW OF SOME ELECTRON-MICROSCC FRACTOGRAPHIC STUDIES OF ALUMINUM ALLOYS,
AD-434 212 DIV. 17

ALUMINUM COMPOUNDS
INCENDIARY GELS

INVESTIGATION OF ALKYL ALUMINUM COMPOUNDS,
AD-434 327 DIV. 3

ALUMINUM COMPOUNDS
OXIDES
ALUMINUM OXIDE, DATA SHEETS,
AD-434 173 DIV. 14

ALUMINUM COMPOUNDS
OXYCHLORIDES
AQUEOUS BEHAVIOR OF ALUMINUM OXYCHLORIDE,
AD-434 442 DIV. 4

AMMONIA
BATTERIES + COMPONENTS
SIXTH SYMPOSIUM OF AMMONIA BATTERIES AT UNIVER- SITY OF CALIFORNIA, BERKELEY, CALIFORNIA, JANUARY 30-31, 1964, (SUPPLEMENT).
AD-434 022 DIV. 7
RESEARCH ON AMMONIA BATTERY SYSTEM,
AD-435 008 DIV. 7

AMMONIA
LOW TEMPERATURE BATTERIES
SIXTH SYMPOSIUM ON AMMONIA BATTERIES AT UNIVERSITY OF CALIFORNIA, BERKELEY, CALIFORNIA, JANUARY 30-31, 1964,
AD-433 973 DIV. 7

AMMUNITION
MILITARY REQUIREMENTS
THE DISTRIBUTION OF ROUNDS FIRED IN STOCHASTIC DUELS
AD-433 764 DIV. 18

AMPHIBIOUS VEHICLES
MOTION
MOTIONS OF TILT FLOAT VEHICLES IN WAVES,
AD-434 163 DIV. 11
OPTIMUM NOISE PERFORMANCE OF MULTITERMINAL AMPLIFIERS,
AD-434 781 DIV. 8

AMPLIFIERS
STABILIZATION
DIAGRAM OF AUTOMATIC COMPENSATION OF DRIFT OF ZERO IN ELECTROMETRIC AMPLIFIERS AND ITS ANALYSIS,
AD-434 967 DIV. 8

ANALOG-DIGITAL COMPUTER
ANALYSIS
A HYBRID ANALOG-DIGITAL PARAMETER OPTIMIZER FOR ASTRAC II,
AD-434 559 DIV. 30

ANALOG-DIGITAL COMPUTERS
MODULATORS
A DELTA-SIGMA MODULATION SYSTEM FOR TIME DELAY AND ANALOG FUNCTION STORAGE,
AD-434 539 DIV. 30

ANTENNA CONFIGURATIONS
ANTENNAS
AN INVESTIGATION OF THE PERFORMANCE OF A STEER- ABLE MULTIPLICATIVE CIRCULAR ANTENNA ARRAY USING ANALOGUE TECHNIQUES,
AD-434 910 DIV. 8

ANTENNA MASTS
PERFORMANCE (ENGINEERING)
30 FOOT LIGHTWEIGHT TELESCOPIC MAST, PHASE II,
AD-433 841 DIV. 8

ANTENNAS
ANTENNA CONFIGURATIONS
AN INVESTIGATION OF THE PERFORMANCE OF A STEER- ABLE MULTIPLICATIVE CIRCULAR ANTENNA ARRAY USING ANALOGUE TECHNIQUES,
AD-434 910 DIV. 8

ANTENNAS
DESIGN
DERIVATION OF AEROSPACE ANTENNA COUPLING - FACTOR INTERFERENCE PREDICTION TECHNIQUES,
AD-434 099 DIV. 8

ANTENNAS
DIFFRACTION
THE DIFFRACTION THEORY OF LARGE APERTURE SPHERI- CAL REFLECTOR ANTENNAS,
AD-433 597 DIV. 8

ANTENNAS
DIRECTION FINDING
USE OF THE BEVERAGE ANTENNA IN WIDE APERTURE HIGH FREQUENCY DIRECTION FINDING, PART IV: THEORY,
AD-434 352 DIV. 8

ANTENNAS
ELECTRONIC SCANNERS
RESEARCH STUDY FOR ELECTRONICALLY-STEERABLE GROUND-BASED ANTENNA SYSTEM,
AD-434 398 DIV. 8

ANTENNAS
HIGH TEMPERATURE RESEARCH
HIGH TEMPERATURE ANTENNA INVESTIGATION AND DEVELOPMENT,
AD-434 826 DIV. 8

ANTENNAS
POLARIZATION
POLARIZATION COUPLING CURVES,
AD-433 951 DIV. 8

ANTENNAS
STATISTICAL ANALYSIS
STATISTICAL EVALUATION OF THE BEAM DISPLACEMENT IN A SYSTEM OF RADIATORS,
AD-433 531 DIV. 8

ANTENNAS
TRACKING
EXPERIMENTAL RESULTS CONCERNING THE CONICAL SCANNING ERROR SIGNAL OF A BROAD-BAND ANTENNA SYSTEM,
AD-433 489 DIV. 8

ANTIMISSILE DEFENSE SYSTEMS
URBAN AREAS
NOTES ON THE STRATEGIC IMPLICATION OF MISSILE DEFENSE FOR CITIES
AD-348 656 DIV. 18

ARC WELDING
AUTOMATION
AUTOMATIC ELECTRIC ARC WELDING OF TITANIUM,
AD-434 945 DIV. 26

ARGON
THERMODYNAMICS
TABLES OF THERMODYNAMIC PROPERTIES OF ARGON FROM 100 TO 3000 K,
AD-434 368 DIV. 25

ARMED FORCES (FOREIGN)
CLOTHING
INDIVIDUAL CLOTHING AND EQUIPMENT FOR INDIGENOUS FORCES IN SOUTHEAST ASIA,
AD-433 874 DIV. 29

ARMING DEVICES
ACCELEROMETERS
ARM SAFE DEVICE XM-52,
AD-435 007 DIV. 12

AROMATIC COMPOUNDS
OXIDATION
OXIDATION OF AROMATIC COMPOUNDS BY ELECTRON TRANSFER,
AD-434 557 DIV. 4

ARSENIDES
GALLIUM COMPOUNDS
EPITAXIAL VAPOR GROWTH OF III-V COMPOUNDS,
AD-434 756 DIV. 25

ASTRONAUTS
RHYTHM (BIOLOGY)
BIOLOGICAL RHYTHMS AND ASTRONAUTIC ,
AD-433 610 DIV. 16

ASTRONAUTS
STRESS (PHYSIOLOGY)
OVERLOADING AND WAY OF INCREASE OF ENDURANCE OF ORGANISM,
AD-434 948 DIV. 16

ASTRONOMICAL CAMERAS
MIRRORS
RESEARCH STUDY AND DEVELOPMENT OF 1-METER MIRROR TELESCOPE FOR LUNAR AND PLANETARY PHOTOGRAPHY,
AD-434 769 DIV. 24

ATMOSPHERE
DIFFUSION
CALCULATION OF THE SPATIAL DIFFUSION OF SMALL PARTICLES IN AN EXPONENTIAL ATMOSPHERE,
AD-434 009 DIV. 2

ATMOSPHERE
GAS DISCHARGES
NEGATIVE IONS IN AFTERGLOWS IN ATMOSPHERIC GASES,
AD-434 191 DIV. 2

ATMOSPHERE
LIGHT TRANSMISSION
RESEARCH ON ATMOSPHERIC OPTICAL RADIATION TRANS- MISSION,
AD-434 773 DIV. 25

ATMOSPHERE
SCIENTIFIC RESEARCH
STUDY OF TACTICAL ARMY AIRCRAFT (TAALS), TASK 1 - ATMOSPHERIC STUDIES,
AD-433 632 DIV. 2

ATMOSPHERE MODELS
VENUS
A WATER-CLOUD INTERPRETATION OF VENUS' MICROWAVE CONTINUUM,
AD-434 501 DIV. 2

ATMOSPHERIC PRECIPITATION
MEASUREMENT
WEATHER RADAR TECHNIQUE DEVELOPMENT
AD-433 912 DIV. 2

ATMOSPHERIC PRECIPITATION
PROBABILITY
PROBABILITY OF SEQUENCES OF WET AND DRY DAYS IN KANSAS,
AD-433 799 DIV. 2

ATMOSPHERIC PRECIPITATION
RADAR ECHO AREAS
THE DISTORTION CUMULONIMBUS PRECIPITATION OB- SERVED BY RADAR,
AD-434 779 DIV. 2

ATMOSPHERIC SOUNDING
CORRECTIONS
CONSIDERATIONS ON ANALYSIS OF ATMOSPHERIC STRUCTURE DATA WITH EMPHASIS ON THE COMPUTATION OF THE ANGULAR DISTANCE FROM THE SUB-SOLAR POINT,
AD-433 641 DIV. 2

ATOMIC CLOCKS
OSCILLATORS
ATOMIC OSCILLATOR DEVICE FOR NAVIGATION GUIDANCE,
AD-434 078 DIV. 19

ATOMIC SPECTROSCOPY
ABSORPTION SPECTRUM
TWO CONTRIBUTIONS OF O. B. FIRSOV TO ATOMIC SPECTROSCOPY,
AD-435 013 DIV. 25

ATOMIC STRUCTURE
LITHIUM
THE FINE STRUCTURE OF THE 2P TERMS OF THE LITHIUM ISOELECTRONIC SEQUENCE,
AD-434 565 DIV. 25

ATOMIZATION
LIQUIDS
METHODS OF DESCRIBING DROPLET-SIZE DISTRIBUTIONS FROM ATOMIZED SOLUTIONS,
AD-434 106 DIV. 15

ATTENTION
MUSIC
VIGILANCE WITH BACKGROUND MUSIC,
AD-433 624 DIV. 28

AUTOMATIC PILOTS
MATHEMATICAL ANALYSIS
ANALYSIS OF MULTILOOP VEHICULAR CONTROL SYSTEMS,
AD-434 799 DIV. 1

AUTOMATION
MACHINE TOOLS
SELF-ADJUSTING SYSTEM OF PROGRAM CONTROL OF METAL-CUTTING MACHINES,
AD-434 961 DIV. 24

AUTOMATION
PRODUCTION
PRODUCTION ENGINEERING MEASURE, MECHANIZATION OF SEMICONDUCTOR DEVICES 2N559-2N1094,
AD-433 812 DIV. 8

AVIATION PERSONNEL
NAVAL TRAINING
PERSONALITY ORIENTATION AND SUCCESS IN NAVAL AVIATION TRAINING,
AD-434 922 DIV. 23

AVIATION PERSONNEL
TRAINING
PERFORMANCE EVALUATION OF APPRENTICE AIR PASSEN- GER SPECIALISTS,
AD-434 042 DIV. 28

AXIALLY SYMMETRIC FLOW
TURBULENT BOUNDARY LAYER
TURBULENT BOUNDARY LAYER ON AN AXISYMMETRICAL BODY RAPIDLY REVOLVING IN AN AXIAL FLOW,
AD-433 581 DIV. 9

AXIAL-FLOW COMPRESSORS
STABILITY
BROADENING OF REGION OF STABLE WORK OF A STAGE OF AN AXIAL COMPRESSOR,
AD-434 944 DIV. 27

AZIDES
GAS GENERATING SYSTEMS
FEASIBILITY TESTING OF A NITROGEN-GENERATING SOLID CHARGE (SODIUM AZIDE) FOR PROPELLANT TANK PRESSURIZATION,
AD-433 729 DIV. 10

BACTERIA
ENZYMES
ACTIVITIES OF HYDROGENASE IN MARINE ENVIRONMENTS AND THE CORROSION OF IRON,
AD-433 549 DIV. 16

BACTERIA
GENETICS
TO INVESTIGATE GENETIC INSTABILITY IN BACTERIA, PARTICULARLY WITH RESPECT TO THE PRESENCE OF CONTROLLING EPISOMES,
AD-434 869 DIV. 16

BALANCES
WEIGHT
DESIGN EVALUATION/QUALIFICATION TEST OF CRYOGENIC CALIBRATION WEIGHT SYSTEM, MEASURING AND RECORDING,
AD-433 376 DIV. IDEP

BANDWIDTH
VISCOELASTICITY
FREQUENCY RESPONSE OF NON-LINEAR VISCOELASTIC SOLIDS,
AD-434 682 DIV. 25

BANKING
MONEY
EFFECTS OF INFLATION ON THE COMPOSITION OF THE MONEY SUPPLY,
AD-433 851 DIV. 32

BARIUM COMPOUNDS
TITANATES
GROWTH TWINNING IN CERAMIC SYSTEMS,
AD-434 228 DIV. 25

BASE FLOW
PRESSURE
BASE PRESSURE BEHIND TWO-DIMENSIONAL AND AXIALLY SYMMETRIC BACKWARD FACING STEPS IN A TURBULENT SUPERSONIC FLOW,
AD-434 823 DIV. 9

BATTERIES + COMPONENTS
ALKALINE CELLS
LITHIUM-NICKEL HALIDE SECONDARY BATTERY INVESTIGATION,
AD-433 616 DIV. 7
DESIGN, FABRICATION AND TESTING OF VENTED, RECHARGEABLE SILVER-CADMIUM CELLS,
AD-434 041 DIV. 7

BATTERIES + COMPONENTS
ELECTRODES
LITHIUM ANODE LIMITED CYCLE SECONDARY BATTERY,
AD-433 543 DIV. 7

BATTERIES + COMPONENTS
ELECTROLYTES
RESEARCH ON AMMONIA BATTERY SYSTEM,
AD-435 008 DIV. 7

BATTERIES + COMPONENTS
PRIMARY CELLS
LOW TEMPERATURE OPERATION OF BATTERIES,
AD-433 871 DIV. 7

BEAMS (STRUCTURAL)
STRESSES
BEHAVIOR OF SIMPLE AND RESTRAINED DEEP REIN- FORCED CONCRETE BEAMS UNDER STATIC LOADING,
AD-434 074 DIV. 13

BEARINGS
HYDRODYNAMICS
ON THE SPIRAL GROOVED, SELF ACTING, GAS BEARING,
AD-433 660 DIV. 26

BIBLIOGRAPHIES
ADAPTIVE CONTROL SYSTEMS
ADAPTIVE CONTROL SYSTEMS: AN ANNOTATED BIBLIOGRAPHY,
AD-433 807 DIV. 30

BIBLIOGRAPHIES
CORROSION
AEROSPACE CORROSION AND MOISTURE PROBLEMS: A REVIEW OF THE RESEARCH REPORTS,
AD-433 573 DIV. 17

BIBLIOGRAPHIES
ELECTRONICS
PUBLICATIONS PRESENTATIONS AND PATENTS, 1963,
AD-433 739 DIV. 30

BIBLIOGRAPHIES
EXPERIMENTAL DATA
LITERATURE REVIEW OF EXPERIMENTAL DESIGN THROUGH 1949,
AD-433 913 DIV. 30

BIBLIOGRAPHIES
FERROELECTRIC MATERIALS
FERROELECTRIC BIBLIOGRAPHY SUPPLEMENT,
AD-433 653 DIV. 14

BIBLIOGRAPHIES
INSECTS
CURRENT REFERENCES IN MEDICAL ENTOMOLOGY FROM RUSSIAN, CENTRAL AND EASTERN EUROPEAN, AND CHINESE LITERATURE, VOLUME III, NO. 4,
AD-433 870 DIV. 16

BIBLIOGRAPHIES
LUMINESCENCE
DETECTION OF THE TRIPLET STATE BY EPR AND OTHER METHODS, COMPILATION OF ABSTRACTS BASED ON SOVIET OPEN LITERATURE,
AD-434 712 DIV. 25

BIBLIOGRAPHIES
RELIABILITY (ELECTRONICS)
BIBLIOGRAPHY ON THE USE OF REDUNDANCY AS A MEANS OF IMPROVING RELIABILITY,
AD-433 614 DIV. 8

BIBLIOGRAPHIES
SOCIAL SCIENCE
BIBLIOGRAPHY OF VIET-NAM,
AD-433 783 DIV. 32

BIBLIOGRAPHY
MILITARY PUBLICATIONS
PROFESSIONAL PAPERS CLEARED FOR POSSIBLE PUBLICATION AND/OR PRESENTATION,
AD-434 255 DIV. 32

BIBLIOGRAPHY
REFRACTORY MATERIALS
MATERIALS FOR RE-ENTRY, A SELECTED BIBLIO- GRAPHY, 1959-1963,
AD-433 656 DIV. 12

BIOCHEMISTRY
FUEL CELLS
BIOCHEMICAL FUEL CELLS,
AD-434 713 DIV. 16

BIOLOGY
CONTROL SYSTEMS
SPECIAL ASPECTS OF ENVIRONMENT RESULTING FROM VARIOUS KINDS OF NUCLEAR WARS, PART II, APPENDIX 1-2, HISTORICAL EXAMPLES OF ECOLOGICAL DISASTER (U),
AD-433 784 DIV. 16
NON-GENETIC CONTROL IN BIOLOGICAL SYSTEMS,
AD-433 848 DIV. 16

BIOLOGY
ELECTRONICS
BIOLOGICAL USES OF NONIONIZING RADIATION,
AD-433 659 DIV. 16

BIOLOGY
GENETICS
THE PRINCIPLE OF GENETIC COST,
AD-433 918 DIV. 16

BIOLOGY
RHYTHM (BIOLOGY)
BIOLOGICAL RHYTHMS AND ASTRONAUTI(
AD-433 610 DIV. 16

BIONICS
COMMUNICATION THEORY
COMMUNICATIONS, SEMANTICS, AND INFORMATION SYSTEMS,
AD-434 029 DIV. 5

BITES + STINGS
CULICIDAE
ATTRACTIVENESS AND REPELLENCY OF MAN TO MOSQUITO BITES,
AD-433 866 DIV. 16

BLAST
DAMAGE
PROBABILITY OF PREVENTION OF EXPLOSIVE PROPAGATION AND PERSONNEL INJURY BY PROTECTIVE WALLS,
AD-433 953 DIV. 22

BLAST
SHIELDING
MODEL STUDIES OF LARGE VENTED OPENINGS-PHASE 1,
AD-434 222 DIV. 13

BLOOD
PRESERVATION
DEVELOPMENT OF PROCEDURES FOR THE LOW-TEMPERATURE PRESERVATION OF BLOOD,
AD-433 663 DIV. 16

BLOOD CHEMISTRY
HIGH ALTITUDE
TRANSIENT CHANGES IN ARTERIAL LACTIC ACID OF DOGS AT 21,000 FEET,
AD-434 870 DIV. 16

BLUNT BODIES
SUPERSONIC CHARACTERISTICS
AN ITERATIVE METHOD FOR APPROXIMA' ING THE FLOW FIELD ABOUT A SUPERSONIC BLUNT BODY,
AD-435 078 DIV. 9

BOILERS
VALVES
DIAMOND POWER SPECIALTY CORPORATI(1-1/2IN, - 1500 PSI, TYPE I, CLASS 2, STYLE A BOILER BLOW- DOWN ANGLE VALVE,
AD-433 592 DIV. 26

BONE
GROWTH
A PERSISTENT BONE GROWTH DEFICIT IN THE X- IRRADIATED RAT,
AD-434 219 DIV. 16

BOOST-GLIDE VEHICLES
STABILIZATION SYSTEMS
FIXED-BASE AND IN-FLIGHT SIMULATIONS OF LONGITUDINAL AND LATERAL-DIRECTIONAL HANDLING QUALITIES FOR PILOTED RE-ENTRY VEHICLES,
AD-434 076 DIV. 12

BORINES
COMPLEX COMPOUNDS
ENHANCEMENT OF P-H BONDING IN A PHOSPHINE BORINE,
AD-434 269 DIV. 4

BORON
MANUFACTURING METHODS
THE MECHANICAL AND MICROMECHANICA' PROPERTIES OF BORON,
AD-433 754 DIV. 17

BORON COMPOUNDS
FLUORIDES
THE CRYSTAL STRUCTURE OF BORON TRIFLUORIDE DIHY- DRATE,
AD-433 079 DIV. 25

BORON COMPOUNDS
VINYL PLASTICS
HIGH-TEMPERATURE OR LOW-TEMPERATUR RESISTING ELASTOMERS CONTAINING BORON,
AD-434 904 DIV. 4
HIGH-TEMPERATURE OR LOW-TEMPERATUR RESISTING ELASTOMERS CONTAINING BORON,
AD-434 905 DIV. 4

BOUNDARY LAYER
EQUATIONS
THE ASYMPTOTIC EXPANSION OF THE OUTGOING SOLUTION OF DELTA + K2N2(X)U EQUALS DELTA (X) NEAR X EQUALS 0,
AD-433 975 DIV. 13

BOUNDARY LAYER
PRESSURE
BOUNDARY LAYER WITH PRESSURE GRADIENT IN COM- PRESSIBLE FLUID FLOW,
AD-433 983 DIV. 9

BOUNDARY LAYER
THEORY
THE SOLUTION OF THE EQUATION FOR VON MISES' BOUNDARY LAYER THEORY,
AD-434 975 DIV. 9

BOUNDARY LAYER CONTROL SYSTEMS
SUCTION SLOTS
SUMMARY OF LAMINAR LNV CON- TROL TECHNIQUES NR AIRCRAFT,
AD-434 841 DIV. 9

BOUNDARY VALUE PROBLEMS
MATHEMATICAL ANALYSIS
NUMERICAL STUDIES OF A TWO-POINT NONLINEAR BOUNDARY VALUE PROBLEM USING DYNAMIC PROGRAMMING, INVARIANT IMBEDDING, AND QUASILINEARIZATION,
AD-434 561 DIV. 13

BOUNDARY VALUE PROBLEMS
NUMERICAL METHODS AND PROCEDURES
NUMERICAL SOLUTION OF BOUNDARY-VALUE PROBLEMS BY THE METHOD OF INTEGRAL OPERATORS,
AD-434 898 DIV. 13

BUCKLING (MECHANICS)
CONICAL BODIES
BUCKLING OF ISOTROPIC, ORTHOTROPIC AND RING-STIFFENED CONICAL SHELLS,
AD-434 845 DIV. 20

BUILDINGS
CONSTRUCTION
A TEMPORARY POLAR CAMP,
AD-434 217 DIV. 13

BURNS
THERAPY
TREATMENT OF VESICANT AND THERMAL BURNS,
AD-434 985 DIV. 16

CALCITE
SINGLE CRYSTALS
INVESTIGATION OF NARROW LINE PARAMAGNETIC RESONANCE ABSORPTION SPECTRUM IN SINGLE CRYSTAL CALCITE,
AD-433 680 DIV. 25

CALCIUM COMPOUNDS
FLUORIDES
AN EXPERIMENTAL STUDY OF THE EFFECT OF AN ELECTRIC FIELD ON THE SHARP GREEN FLUORESCENCE TRANSITIONS OF E R IV IN SINGLE CRYSTALLINE FLUORITE,
AD-434 795 DIV. 25

CALIBRATION
MICROPHONES
DEVICE FOR THE CALIBRATION OF MEASURING MICROPHONES,
AD-433 605 DIV. 8

CALORIMETERS
DESIGN
DESIGN, CONSTRUCTION AND TESTING OF A HEAT OF VAPORIZATION CALORIMETER USEFUL IN THE VAPOR PRESSURE RANGE 1 TO 0.001 (0.0001) MM HG AT 25 C,
AD-434 260 DIV. 20

CAMERA TUBES
GUIDED MISSILE TRACKING SYSTEM
PERFORMANCE EVALUATION OF TRAP IMAGE ORTHICON SYSTEM,
AD-433 621 DIV. 8

CAMERA TUBES
TELEVISION EQUIPMENT
NONDESTRUCTIVE SYSTEM FOR INSPECTION OF FIBER GLASS REINFORCED PLASTIC MISSILE CASES AND OTHER STRUCTURAL MATERIALS,
AD-434 819 DIV. 8

CAMOUFLAGE
AIRCRAFT FINISHES
DEVELOPMENT OF COATINGS TO PREVENT OVERHEATING OF UNDERLYING SUBSTRATES ON EXPOSURE TO INTENSE THERMAL RADIATION FOR SHORT PERIODS: NAEC AML 1872, DEVELOPMENT OF BLACK THERMAL REFLECTIVE, SOLVENT REMOVABLE, EXTERIOR CAMOUFLAGE FINISH,
AD-433 744 DIV. 14

CANNULATION
CARDIOVASCULAR SYSTEM
CONSTRUCTION AND USE OF A SIMPLE, SELF-GUIDING CATHETER FOR RIGHT HEART AND PULMONARY

ARTERY IMPLANTATION,
AD-434 423 DIV. 16

CAPACITANCE
ELECTRODES
ON THE PROBLEM OF MEASURING BY MEANS OF ALTERNATING CURRENT THE DIFFERENTIAL CAPACITANCE OF ELECTRODES AND THE RESISTANCE OF ELECTROCHEMICAL REACTIONS,
AD-434 877 DIV. 8

CARDIOVASCULAR SYSTEM
STARVATION
CARDIOVASCULAR EFFECTS OF REFEEDING STRESS FOLLOWING STARVATION. XII. CONTINUATION OF LONG- TERM STARVATION AND REFEEDING EPISODES, FINAL EPISODES AND POST MORTEM RESULTS,
AD-434 116 DIV. 16

CARTRIDGES
DESIGN
PRODUCT IMPROVEMENT TEST OF CARTRIDGE, 105-MM, HEP-T, M393A1 (ADAPTION OF TRACER, XM1E1),
AD-434 376 DIV. 22A

CARTRIDGES (PAD)
JETTISONABLE COCKPITS
A BASIC INVESTIGATION OF CONTROLLABLE THRUST DEVICES FOR ESCAPE FROM ADVANCED FLIGHT VEHICLES, PHASE II, PART 1, OPERATION UP TO 400 MILES, PART 2, COMPUTER STUDY AND EXPERIMENTAL PROGRAM,
AD-434 289 DIV. 27

CASTINGS
ALUMINUM ALLOYS
MINOR ALLOY ADDITIONS TO ALUMINUM ALLOY MELTS,
AD-434 214 DIV. 17

CASTINGS
STEEL
DEVELOPMENT OF HIGH INTEGRITY CLOSE TOLERANCE HIGH STRENGTH AIRCRAFT QUALITY STEEL CASTINGS,
AD-434 383 DIV. 17

CATALYSIS
SILVER
THE EFFECT OF DISLOCATIONS AND ORIENTATION UPON THE ELECTRICAL DOUBLE LAYER CAPACITY OF SILVER SURFACES, PART I, SUPPLEMENT TO FINAL REPORT OF MARCH 1, 1963: THE EFFECT OF SURFACE PREPA- RATION AND DISLOCATIONS ON THE SILVER CATALYZED DECOMPOSITION OF FORMIC ACID,
AD-434 716 DIV. 25

CATALYSTS
SILVER
THE EFFECT OF DISLOCATIONS AND ORIENTATION UPON THE ELECTRICAL DOUBLE LAYER CAPACITY OF SILVER SURFACES, PART I, SUPPLEMENT TO FINAL REPORT OF MARCH 1, 1963: THE EFFECT OF SURFACE PREPA- RATION AND DISLOCATIONS ON THE SILVER CATALYZED DECOMPOSITION OF FORMIC ACID,
AD-434 716 DIV. 25

CATAPULTS
HEATING ELEMENTS
INVESTIGATION OF 70-30 COPPER-NICKEL CATAPULT TROUGH HEATER TUBING,
AD-433 858 DIV. 31

CATHODE RAY TUBES
AIRBORNE
RESEARCH AND DEVELOPMENT ON TRAVELING IMAGE STORAGE TUBE,
AD-433 860 DIV. 8

CATHODE RAY TUBES
PRODUCTION
PRODUCTION ENGINEERING MEASURE ON HIGH PERVEANCE CATHODE-RAY TUBES,
AD-433 720 DIV. 8

CATHODES (ELECTRON TUBES)
MATERIALS
INVESTIGATION OF VARIOUS ACTIVATOR REFRACTORY SUBSTRATE COMBINATIONS,
AD-434 766 DIV. 8

CATHODES (ELECTRON TUBES)
NOISE (RADIO)
RESEARCH ON LOW NOISE CATHODE DEVELOPMENT,
AD-434 075 DIV. 8

CATHODIC PROTECTION
HYDROGEN EMBRITTLEMENT
HYDROGEN EMBRITTLEMENT RESULTING FROM CORROSION, CATHODIC PROTECTION, AND ELECTROPLATING,
AD-434 914 DIV. 17

CAVITATION
PERFORMANCE (ENGINEERING)
CAVITATION PERFORMANCE OF PROPELLERS IN A SUBMARINE WAKE,
AD-434 185 DIV. 31

CAVITATION
PROPELLERS (MARINE)
OPEN-WATER AND CAVITATION PERFORMANCE OF THE PROPELLER FOR SARGO SS(N)583,
AD-434 288 DIV. 31

CAVITY RESONATORS
PHONONS
RECENT ADVANCES IN MICROWAVE PHONON GENERATION AND DETECTION AND THEIR APPLICATION TO THE STUDY OF PHONON-PHONON INTERACTIONS IN QUARTZ,
AD-434 757 DIV. 25

CELESTIAL MECHANICS
PERTURBATION THEORY
CELESTIAL MECHANICS RESEARCH,
AD-434 412 DIV. 2

CELESTIAL MECHANICS
SATELLITE NETWORKS
EARTH COVERAGE BY SATELLITE CONFIGURATIONS,
AD-433 606 DIV. 12

CELESTIAL MECHANICS
SATELLITES (ARTIFICIAL)
A BRIEF SURVEY OF SATELLITE ORBIT COMPUTATION METHODS AND MAJOR PERTURBATIVE EFFECTS,
AD-434 348 DIV. 12

CERAMIC FIBERS
METALS
REINFORCEMENT OF NICKEL CHROMIUM ALLOYS WITH SAPPHIRE WHISKERS,
AD-433 044 DIV. 14

CERAMIC FIBERS
VAPOR PLATING
A STUDY OF HIGH MODULUS, HIGH STRENGTH FILAMENT MATERIALS BY DEPOSITION TECHNIQUES,
AD-433 501 DIV. 14

CERAMIC MATERIALS
ALUMINUM COMPOUNDS
ALUMINUM OXIDE, DATA SHEETS,
AD-434 173 DIV. 14

CERAMIC MATERIALS
CRYSTAL GROWTH
GROWTH TWINNING IN CERAMIC SYSTEMS,
AD-434 228 DIV. 25

CESIUM
IONIZATION
MECHANISM OF CESIUM IONIZATION,
AD-434 814 DIV. 4

CHANNEL SELECTORS
RADIO RECEIVERS
COMPARISON OF TECHNICAL SPECIFICATIONS FOR THREE TWIN/TRIPLE CHANNEL HF RECEIVERS,
AD-434 335 DIV. 5

CHEMICAL BOMBS
AEROSOLS
EFFECT OF RADIAL DISTANCE FROM HIGH EXPLOSIVE ON BREAKUP CHARACTERISTICS OF SOLID MATERIALS IN SPHERICAL BOMBLETS,
AD-434 105 DIV. 3

CHEMICAL BONDS
PHOSPHINES
ENHANCEMENT OF P-H BONDING IN A PHOSPHINE BORINE,
AD-434 269 DIV. 4
EFFECT OF RADIAL DISTANCE FROM HIGH EXPLOSIVE ON BREAKUP CHARACTERISTICS OF SOLID MATERIALS IN SPHERICAL BOMBLETS,
AD-434 105 DIV. 3

CHROMIUM ALLOYS
DIFFUSION
DIFFUSION IN B.C.C. METALS,
AD-434 751 DIV. 17

CHROMYL RADICALS
NITRATES
TEMPERATURE STABILITY LIMITS AND DIFFERENTIAL THERMAL ANALYSIS OF CHROMYL NITRATE. SYNTHESIS OF TITANIUM IV COMPOUNDS CONTAINING NITRATE GROUPS,
AD-434 262 DIV. 4

CIRCUITS
EQUATIONS
RESISTANCE VARIATION OF EXPLODING WIRES,
AD-434 709 DIV. 25

CIRCUITS
SENSITIVITY
OPTIMIZATION OF POLE SENSITIVITY IN ACTIVE RC NETWORKS,
AD-434 240 DIV. 8

CLIMATOLOGY
AIR MASS ANALYSIS
THE SYNOPTIC CLIMATOLOGY OF CLOUD-FREE AREAS,
AD-433 503 DIV. 2

CLOCKS
FLUIDS
FLUID TIMER FOR ORDNANCE APPLICATIONS,
AD-434 064 DIV. 22

CLOUDS
WEATHER FORECASTING
PROGNOSTIC RELATIONS DEVELOPED BETWEEN CIRCULA- TION VARIABLES AND TOTAL CLOUD AMOUNT BY STATISTICAL METHODS,
AD-433 600 DIV. 2
COMBINATION OF INITIAL AND PROGNOSTIC DATA IN STATISTICAL CLOUD PREDICTION,
AD-434 072 DIV. 2

COAGULATION
PARTICLES
IN REFERENCE TO THE THEORY OF ELECTRICAL COAGULATION OF SPHERICAL AEROSOL PARTICLES,
AD-434 958 DIV. 25

COATINGS
CAMOUFLAGE
DEVELOPMENT OF COATINGS TO PREVENT OVERHEATING OF UNDERLYING SUBSTRATES ON EXPOSURE TO INTENSE THERMAL RADIATION FOR SHORT PERIODS: NAEC AML 1872, DEVELOPMENT OF BLACK THERMAL REFLECTIVE, SOLVENT REMOVABLE, EXTERIOR CAMOUFLAGE FINISH,
AD-433 744 DIV. 14

COAXIAL CABLES
PRODUCTION
DEVELOPMENT AND CONSTRUCTION OF WATERTIGHT COAXIAL CABLES RG 11/AU - RG 217/U - RG 218/U,
AD-435 031 DIV. 7

COILS
FERRITES
MINIATURE THIN FILM INDUCTORS (MODIFICATION NO. 2),
AD-434 051 DIV. 8

COLORIMETRY
SPECTROPHOTOMETERS
COLOR FROM THE METEOROLOGICAL STANDPOINT,
AD-434 391 DIV. 25

COMBUSTION
REACTION KINETICS
INTENSIFICATION OF HOMOGENEOUS COMBUSTION BY LOW-FREQUENCY OSCILLATIONS,
AD-434 966 DIV. 10

COMBUSTION PRODUCTS
THERMODYNAMICS
STUDY OF ROCKET ENGINE EXHAUST PRODUCTS,
AD-433 853 DIV. 10

COMETS
BRIGHTNESS
BRIGHTNESS AND STRUCTURE OF THE NA-EMISSION IN COMETS THE HEADS OF COMETS AND THE LIFETIMES OF THEIR MOLECULES,
AD-433 778 DIV. 2

COMMAND AND CONTROL SYSTEMS
SCHEDULING
STUDY FOR HYPOTHETICAL NARRATIVES FOR USE IN COMMAND AND CONTROL SYSTEMS PLANNING VOLUME III,
AD-435 038 DIV. 18

COMMAND + CONTROL SYSTEMS
COMPUTERS
AUTOMATIC MESSAGE RETRIEVAL, STUDIES FOR THE DESIGN OF AN ENGLISH COMMAND AND CONTROL LANGUAGE SYSTEM,
AD-433 603 DIV. 30

COMMAND + CONTROL SYSTEMS
SCHEDULING
STUDY FOR HYPOTHETICAL NARRATIVES FOR USE IN COMMAND AND CONTROL SYSTEMS PLANNING, VOLUME II, THE ALTERNATIVE NATIONAL POLICY CARD DECK,
AD-434 798 DIV. 18

COMMERCE
ANALYSIS
TRENDS IN CONSUMPTION IN THE SOVIET UNION,
AD-434 817 DIV. 32
RESEARCH STUDY FOR ELECTRONICALLY STEERABLE GROUND-BASED ANTENNA SYSTEM,
AD-434 398 DIV. 8

COMMUNICATION SATELLITES (ACTIVE)
VOICE COMMUNICATIONS
APPLIED RESEARCH STUDY ON SATELLITE COMMUNICA- TIONS, VOLUME 2,
AD-433 884 DIV. 5

COMMUNICATION SATELLITES (PASSIVE)
SCIENTIFIC RESEARCH
DIVISION 6, SPACE COMMUNICATIONS,
AD-433 602 DIV. 5

COMMUNICATION SYSTEMS
MILITARY REQUIREMENTS
UNICOM, UNIVERSAL INTEGRATED COMMUNICATION SYSTEM,
AD-434 182 DIV. 5

COMMUNICATION SYSTEMS
NETWORKS
OUTPUTS FROM THE NETWORK ANALYSIS COMPUTER PRO- GRAMS: A SUMMARY REPORT,
AD-434 834 DIV. 30
THE NETWORK ROUTING AND EVALUATION PROGRAM,

AD-434 835 DIV. 5
METHODS FOR DETERMINING OPTIMAL TRAFFIC ROUTES IN LARGE COMMUNICATION NETWORKS,
AD-434 856 DIV. 5

COMMUNICATION SYSTEMS
PERFORMANCE (ENGINEERING)
LINK EVALUATION AND TAPE MERGING COMPUTER PROGRAMS,
AD-434 833 DIV. 30

COMMUNICATION SYSTEMS
SPACECRAFT
DIVISION 6, SPACE COMMUNICATIONS,
AD-433 602 DIV. 5

COMMUNICATION THEORY
DISPLAY SYSTEMS
INFORMATION TRANSFER IN DISPLAY-CONTROL SYSTEMS,
AD-434 452 DIV. 30

COMMUNICATION THEORY
LANGUAGE
COMMUNICATIONS, SEMANTICS, AND INFORMATION SYSTEMS,
AD-434 029 DIV. 5

COMMUNISTS
LEADERSHIP
ON THE TRAIL OF CHOU EN-LAI IN AFRICA,
AD-433 967 DIV. 32

COMPLEX COMPOUNDS
POLAROGRAPHIC ANALYSIS
POLAROGRAPHIC STUDIES IN CERTAIN NON-AQUEOUS SYSTEMS,
AD-433 694 DIV. 4

COMPLEX COMPOUNDS
SYNTHESIS (CHEMISTRY)
NEW HYDRIDES OF TRANSITION METALS,
AD-434 555 DIV. 4

COMPLEX NUMBERS
ALGEBRA
ON SUMS OF POWERS OF COMPLEX NUMBERS: AN IMPROVED ESTIMATE,
AD-433 881 DIV. 18

COMPOSITE MATERIALS
REINFORCING MATERIALS
REINFORCEMENT OF NICKEL CHROMIUM ALLOYS WITH SAPPHIRE WHISKERS,
AD-435 044 DIV. 14

COMPUTER LOGIC
LINEAR SYSTEMS
CELLULAR LINEAR-INPUT LOGIC,
AD-433 802 DIV. 30

COMPUTER LOGIC
VIDEO MAP MATCHING
BINARY-TO-VIDEO DATA CONVERTER,
AD-434 759 DIV. 8

COMPUTERS
NOISE GENERATORS
A HYBRID ANALOG-DIGITAL PSEUDO-RANDOM NOISE GENERATOR,
AD-434 556 DIV. 30

COMPUTERS
PATTERN RECOGNITION
A PREFACE TO COMPUTATIONAL STYLISTICS,
AD-433 513 DIV. 30

COMPUTERS
SEQUENCES
A MODULAR REALIZATION OF SYMMETRIC SEQUENTIAL MACHINES,
AD-433 821 DIV. 30

CONCRETE
BINDERS
LABORATORY AND FIELD STUDY OF EPOXY ASPHALT CONCRETE,
AD-434 896 DIV. 14

CONCRETE
ELASTICITY
YOUNG'S MODULUS OF ELASTICITY AND POISSON'S RATIO OF PLAIN CONCRETE,
AD-434 917 DIV. 13

CONCRETE
MANUFACTURING METHODS
HIGH-COMPRESSIVE-STRENGTH CONCRETE, DEVELOPMENT OF CONCRETE MIXTURES,
AD-433 651 DIV. 14

CONCRETE
ULTRASONIC RADIATION
ULTRASOUND,
AD-434 996 DIV. 13

CONDENSATION
REACTION KINETICS
KINETICS OF CONDENSATION FROM THE VAPOR PHASE,
AD-434 286 DIV. 4

CONFORMAL MAPPING
VECTOR ANALYSIS
THE FREQUENCY CHECK, AN EXTENSION OF THE VECTOR VERIFICATION METHOD,
AD-434 155 DIV. 28

CONICAL BODIES
HYPERSONIC FLOWS
DETERMINING THE AERODYNAMIC FORCES ACTING ON BODIES WITH FRONTAL DISRUPTION ZONE IN HYPERSONIC FLOWS,
AD-433 538 DIV. 9

CONTAINERS
SEALS (STOPPERS)
HERMETIC SEALING OF PROPELLANT CONTAINERS BY PRESSURE WELDING,
AD-434 175 DIV. 26

CONTINUED FRACTIONS
THEORY
A VALUE-REGION PROBLEM OCCURRING IN THE THEORY OF CONTINUED FRACTIONS,
AD-433 474 DIV. 18

CONTINUUM MECHANICS
MATERIALS
ON THE POSTULATE OF STABILITY OF MATERIAL IN THE MECHANICS OF CONTINUA,
AD-435 076 DIV. 13

CONTINUUM MECHANICS
STRESSES
MULTIPOLAR CONTINUUM MECHANICS,
AD-434 679 DIV. 28

CONTROL SYSTEMS
AUTOMATIC
SOME QUESTIONS ABOUT THE STATISTICAL DYNAMICS OF AUTOMATIC REGULATION SYSTEMS,
AD-433 524 DIV. 18

CONTROL SYSTEMS
BIBLIOGRAPHIES
ADAPTIVE CONTROL SYSTEMS: AN ANNOTATED BIBLIOGRAPHY,
AD-433 807 DIV. 30

CONTROL SYSTEMS
MILLING MACHINES
SELF-ADJUSTING SYSTEM OF PROGRAM CONTROL OF METAL-CUTTING MACHINES,
AD-434 961 DIV. 26

CONTROL SYSTEMS
PROBABILITY
A LOCK-ON PROBABILITY ANALYSIS FOR THE INITIAL SYNCHRONIZATION OF PHASE-LOCKED LOOPS,
AD-433 698 DIV. 8

CONTROL SYSTEMS
STATISTICAL PROCESSES
SEMI-MARKOVIAN CONTROL SYSTEMS,
AD-434 242 DIV. 18

CONTROLLABLE THRUST ROCKET MOTORS
JETTISONABLE COCKPITS
A BASIC INVESTIGATION OF CONTROLLABLE THRUST DEVICES FOR ESCAPE FROM ADVANCED FLIGHT VEHICLES, PHASE II, PART 1, OPERATION UP TO 400 MILES, PART 2, COMPUTER STUDY AND EXPERIMENTAL PROGRAM,
AD-434 289 DIV. 27

CONTROLLED ATMOSPHERES
NUCLEAR-POWERED VESSELS
SUBMARINE ATMOSPHERE STUDIES ABOARD USS SCULPIN,
AD-433 896 DIV. 31

COOLANTS
CORROSION INHIBITION
NEW CORROSION INHIBITORS FOR ANTIFREEZES,
AD-433 661 DIV. 14
THE DEVELOPMENT OF AN IMPROVED COOLING SYSTEM CORROSION INHIBITOR,
AD-433 829 DIV. 14

CORROSION
BIBLIOGRAPHIES
AEROSPACE CORROSION AND MOISTURE PROBLEMS: A REVIEW OF THE RESEARCH REPORTS,
AD-433 573 DIV. 17

CORROSION
FLUORIDES
CORROSION OF METALLIC MATERIALS IN AQUEOUS SOLUTIONS OF FLUORIDES AT HIGH TEMPERATURES,
AD-434 879 DIV. 17

CORROSION
HYDROGEN EMBRITTLEMENT
HYDROGEN EMBRITTLEMENT RESULTING FROM CORROSION, CATHODIC PROTECTION, AND ELECTROPLATING,
AD-434 914 DIV. 17

CORROSION
IRON
ACTIVITIES OF HYDROGENASE IN MARINE ENVIRONMENTS AND THE CORROSION OF IRON,
AD-433 549 DIV. 16

CORROSION
STRESSES
INVESTIGATION OF THE MECHANISM OF STRESS CORRO- SION OF ALUMINUM ALLOYS,
AD-434 234 DIV. 17

CORROSION INHIBITION
COOLANTS
NEW CORROSION INHIBITORS FOR ANTIFREEZES,
AD-433 661 DIV. 14
THE DEVELOPMENT OF AN IMPROVED COOLING SYSTEM CORROSION INHIBITOR,
AD-433 829 DIV. 14

CORROSION-RESISTANT ALLOYS
FLUORIDES
CORROSION OF METALLIC MATERIALS IN AQUEOUS SOLUTIONS OF FLUORIDES AT HIGH TEMPERATURES,
AD-434 879 DIV. 17
THE MODULATION OF HEAVY NUCLEI IN THE PRIMARY COSMIC RADIATION,
AD-434 176 DIV. 2

COSMIC RAYS
MEASUREMENTS
TIME VARIATIONS IN COSMIC RAYS AND RADIOSONDE MEASUREMENTS,
AD-434 540 DIV. 2

COSMIC RAYS
SCIENTIFIC RESEARCH
SCIENTIFIC RESEARCH; COSMIC RAYS,
AD-433 709 DIV. 2

COSTS
SCIENTIFIC RESEARCH
A DISCUSSION OF SPACE PROGRAM COSTS,
AD-433 852 DIV. 32

CREEP
NIOBIUM
GENERAL RESEARCH, CREEP OF NIOBIUM AT LOW TEMPERATURES,
AD-433 492 DIV. 17

CREEP
RUPTURE
AN ANALYSIS OF CREEP RUPTURE,
AD-434 718 DIV. 28

CRYSTAL DETECTORS
OPTICAL EQUIPMENT
RESEARCH ON TECHNIQUES FOR LIGHT MODULATION DETECTION,
AD-434 127 DIV. 28

CRYSTAL OSCILLATORS
QUARTZ RESONATORS
QUARTZ CRYSTAL OSCILLATOR CIRCUITS STUDY,
AD-433 816 DIV. 8

CRYSTAL OVENS
DESIGN
METHODS FOR LOW POWER TEMPERATURE CONTROL,
AD-434 071 DIV. 8

CRYSTAL RECTIFIERS
ELECTRONIC SWITCHES
A PRODUCTION ENGINEERING MEASURE FOR THE IMPROVEMENT OF PRODUCTION TECHNIQUES TO INCREASE THE RELIABILITY FOR DIFFUSED SICON CONTROLLED SWITCHES TYPES 2N689,
AD-434 272 DIV. 8

CRYSTAL STRUCTURE
BORON COMPOUNDS
THE CRYSTAL STRUCTURE OF BORON TRIFLUORIDE DIHYDRATE,
AD-435 079 DIV. 28

CRYSTAL STRUCTURE
POLYMERS
EFFECT OF PLASTICIZER, CHAIN ENDS AND COMONOMER ON THE GLASS TRANSITION TEMPERATURE OF POLYMERS,
AD-434 299 DIV. 4

CRYSTAL STRUCTURE
SYMMETRY (CRYSTALLOGRAPHY)
THE FREQUENCY CHECK, AN EXTENSION OF THE VECTOR VERIFICATION METHOD,
AD-434 155 DIV. 28

CRYSTALS
MECHANICAL PROPERTIES
THE MECHANICAL AND MICROMECHANICAL PROPERTIES OF BORON,
AD-433 754 DIV. 17

CRYSTALS
SUPERHIGH FREQUENCY
HIGH PRECISION MINIATURE CRYSTAL UNITS 4.3 TO 20 MC,
AD-433 708 DIV. 8

CULICIDAE
BITES + STINGS
ATTRACTIVENESS AND REPELLENCY OF MAN TO MOSQUITO BITES,
AD-433 866 DIV. 16

CYCLOALKANES
SYNTHESIS (CHEMISTRY
A SYNTHESIS OF C3H3+(HYPOTHETICAL)
AD-433 643 DIV. 4

CYLINDRICAL BODIES
FILAMENT WOUND CONSTRUCTION
OPTIMUM CONSTRUCTION OF REINFORCED PLASTIC CYLINDERS SUBJECTED TO HIGH EXTERNAL PRESSURE,
AD-433 652 DIV. 14

CYLINDRICAL BODIES
STRUCTURAL SHELLS
THE INTERACTION BETWEEN A STRUCTURAL TUBE AND THE SURROUNDING SOIL,
AD-433 822 DIV. 13
STRESSES IN A PERFORATED CYLINDRICAL SHELL,
AD-434 560 DIV. 28

CYLINDRICAL BODIES
VIBRATION
FORCED VIBRATIONS OF A VISCO-ELAS-

TIC CYLINDER CASE-BONDED TO A THIN ELASTIC SHELL,
AD-434 192 DIV. 23

C-BAND
TRANSPONDERS
SUPERSENSITIVE CRYSTAL VIDEO TRANSPONDER SET AN/DPN-(XE-1),
AD-433 697 DIV. 8

DAMPING
JET ENGINES
STRUCTURAL DAMPING OF OSCILLATIONS OF THIN-WALLED SHELLS OF TYPE OF HOUSING COMPONENTS OF GAS TUR- BINE ENGINES,
AD-434 995 DIV. 1

DATA
ANALYSIS
OPTIMIZING STATISTICAL ANALYSIS: DATA SCREENING AND PRECONDITIONING,
AD-433 551 DIV. 30
DATA PROCESSING, LEAST SQUARES PREPARATION, AND PATTERSON SHARPENING PROGRAMS FOR THE CONTROL DATA CORPORATION 1604,
AD-434 158 DIV. 30

DATA
RECORDING SYSTEMS
DEVELOPMENT AND EVALUATION OF A BOILER EFFICIENCY COMPUTING AND INDICATING SYSTEM,
AD-433 968 DIV. 30
METHODOLOGIES FOR SYSTEM DESIGN,
AD-434 749 DIV. 30

DATA STORAGE SYSTEMS
NETWORKS
CELLULAR LINEAR-INPUT LOGIC,
AD-433 802 DIV. 30

DATA TRANSMISSION SYSTEMS
AIR FORCE
TEST REPORT FOR CATEGORY I ON-SITE INTEGRATION TESTS OF THE ELECTRONIC DATA TRANSMISSION COMMUNICATIONS CENTRALS, AN/FYQ-5, AT SAC HEADQUARTERS, OFFUTT AFB AND 8TH AF HEADQUARTERS, WESTOVER AFB,
AD-433 847 DIV. 5
DEVELOPMENT OF (PCM) DATA BUFFERS,
AD-435 083 DIV. 30

DECISION MAKING
BEHAVIOR
THE PSYCHOLOGICAL DIMENSIONALITY OF BASIC ELECTRONIC CIRCUITS: II. INTERPRETATION OF THE STATISTICAL DIMENSIONS,
AD-434 251 DIV. 28

DECISION MAKING
GAME THEORY
DECISION PROCEDURES FOR FINITE DECISION PROBLEMS UNDER COMPLETE IGNORANCE,
AD-433 878 DIV. 15

DEFLAGRATION
THEORY
MAGNETOHYDRODYNAMIC THEORY OF DEFLAGRATION AND DETONATION,
AD-434 569 DIV. 25

DEFORMATION
ULTRASONIC RADIATION
DEFORMATION OF METAL IN AN ULTRASONIC FIELD,
AD-434 978 DIV. 17

DEMODULATORS
VIDEO SIGNALS
VIDEO DETECTOR DIODES FOR COUNTERMEASURES EQUIPMENT,
AD-434 700 DIV. 8

DENTISTRY
MEDICAL RESEARCH
ABSTRACTS OF RESEARCH REPORTS OF PROJECTS COM- PLETED IN PARTIAL FULFILLMENT OF REQUIREMENTS OF THE GENERAL POSTGRADUATE COURSE,
AD-433 628 DIV. 16
HORIZONTAL TOOTH MOBILITY IN CAREFULLY SCREENED SUBJECTS,
AD-434 871 DIV. 16

DESIGN
LOADING (MECHANICS)
SKEWED LOAD-STRENGTH DISTRIBUTION IN RELIABILITY,
AD-434 414 DIV. 15

DESIGN
PROGRAMMING (COMPUTERS)
THE USE OF ADAPTIVE CONSTRAINED DESCENT IN SYSTEMS DESIGN,
AD-433 721 DIV. 30

DETECTION
METEORITES
DESIGN, DEVELOPMENT, AND CONSTRUCTION OF MICRO- METEORITE DETECTION SYSTEMS,
AD-434 784 DIV. 6

DETECTION
THEORY
SIGNAL DETECTION BY HUMAN OBSERVERS,
AD-434 825 DIV. 23

DETECTIONS
NUCLEAR EXPLOSIONS
VELA UNIFORM RESEARCH PUBLICATIONS,
AD-433 516 DIV. 6

DETECTORS
EFFECTIVENESS
THE EVALUATION OF THE MAVERFORD-BIONIC INSTRU- MENTS OBSTACLE DETECTOR,
AD-435 030 DIV. 16

DETECTORS
SEISMIC WAVES
DESIGN AND DEVELOPMENT OF A PERSONNEL-VEHICULAR DISCRIM-INATOR,
AD-434 232 DIV. 6

DETECTORS
SPACEBORNE
DESIGN, DEVELOPMENT, AND CONSTRUCTION OF MICRO- METEORITE DETECTION SYSTEMS,
AD-434 784 DIV. 6

DETONATION WAVES
LIQUIDS
CONCERNING A DEVICE FOR THE DETONATION OF LIQUID EXPLOSIVES,
AD-434 956 DIV. 22

DETONATIONS
EXPLOSIVE MATERIALS
EXPERIMENTAL DETERMINATION OF THE EXPONENT OF POLITROPIC PRODUCTS OF DETONATION FOR CERTAIN LIQUID EXPLOSIVES,
AD-434 955 DIV. 22

DETONATIONS
THEORY
INVESTIGATION OF THE DETONATION OF CONDENSED EXPLOSIVES,
AD-433 493 DIV. 28
MAGNETOHYDRODYNAMIC THEORY OF DEFLAGRATION AND DETONATION,
AD-434 569 DIV. 25

DETONATORS
CHARGES (EXPLOSIVES)
TEST PROGRAM TO ESTABLISH AN ACCEPTABLE NON-PRO- PRIETARY IGNITION CHARGE FOR THE M6 ELECTRIC BLASTING CAP,
AD-433 760 DIV. 22

DIFFERENTIAL EQUATIONS
NUMERICAL METHODS + PROCEDURES
REPEATED EXTRAPOLATION TO THE LIMIT IN THE NUMERICAL SOLUTION OF ORDINARY DIFFERENTIAL EQUATIONS,
AD-434 254 DIV. 18
SIMPLIFIED PREDICTOR-CORRECTOR METHODS,
AD-434 256 DIV. 18

DIFFERENTIAL EQUATIONS
PERTURBATION THEORY
ALMOST PERIODIC SURFACES,
AD-434 210 DIV. 18

DIFFERENTIAL EQUATIONS
SPECIAL FUNCTIONS (MATHEMATICAL)
APPROXIMATE SOLUTION OF DIFFEREN-TIAL EQUATIONS WITH DEVIATING ARGUMENTS,
AD-433 528 DIV. 18

DIFFUSION
AEROSOLS
EFFECT OF RADIAL DISTANCE FROM HIGH EXPLOSIVE ON BREAKUP CHARACTERISTICS OF SOLID MATERIALS IN SPHERICAL BOMBLETS,
AD-434 105 DIV. 3
THE FLUORESCENT PARTICLE ATMOSPHERIC TRACER,
AD-434 169 DIV. 3

DIFFUSION
IRON ALLOYS
DIFFUSION IN B.C.C. METALS,
AD-434 751 DIV. 17

DIFFUSION
PARTICLES
CALCULATION OF THE SPATIAL DIFFUSION OF SMALL PARTICLES IN AN EXPONENTIAL ATMOSPHERE,
AD-435 051 DIV. 2

DIFFUSION
SILICON
INVESTIGATION OF DIFFUSION OF SILICON IN CERTAIN TRANSI-TIONAL METALS,
AD-434 940 DIV. 17

DIFFUSION
TRACER STUDIES
STUDY OF INFLUENCE OF REFRACTORY ELEMENTS ON THE SELF-DIFFUSION OF IRON WITH THE HELP OF RADIOACTIVE ISOTOPES,
AD-434 939 DIV. 17

DIGITAL COMPUTERS
PROGRAMMING (COMPUTERS)
METHODS FOR DETERMINING OPTIMAL TRAFFIC ROUTES IN LARGE COMMUNICATION NETWORKS,
AD-434 856 DIV. 5

DIGITAL COMPUTERS
REAL TIME
AUTOMATIC GRAVITY SYSTEM USED ABOARD R/V CHAIN JULY 1962 - SEPTEMBER 1963, SUPPLE-MENTARY REPORT,
AD-434 673 DIV. 2

DIGITAL SYSTEMS
BROADBAND
BROADBAND DIGITAL SEISMOMETER EVALUATION,
AD-433 679 DIV. 2

DIGITAL TO ANALOG CONVERTERS
DATA STORAGE SYSTEMS
A HYBRID ANALOG-DIGITAL PARAMETER OPTIMIZER FOR ASTRAC II,
AD-434 559 DIV. 30

DILATOMETERS
CALIBRATION
AN INVESTIGATION OF INTERDIFFUSION IN METALLIC SINGLE CRYSTALS,
AD-433 509 DIV. 25

DIODES (SEMICONDUCTORS)
MANUFACTURING METHODS
PRODUCTION ENGINEERING MEASURE, MECHANIZATION OF SEMICONDUCTOR DEVICES, 2N560, 2N1051, 2N1072, 2N1195, 1N664, 1N665, 1N666, 1N667, 1N668, 1N669, 1N673, 1N675, 1N697 AND 1N701,
AD-433 773 DIV. 8

DIODES (SEMICONDUCTORS)
MICROWAVE EQUIPMENT
MICROWAVE DIODE RESEARCH,
AD-434 573 DIV. 8

DIODES (SEMICONDUCTORS)
MILLIMETER WAVES
MILLIMETER WAVE DIODE FABRICATION,
AD-434 047 DIV. 8

DIODES (SEMICONDUCTOR)
PRODUCTION
SEMICONDUCTOR MATERIALS,
AD-433 725 DIV. 8

DIODES (SEMICONDUCTOR)
VIDEO SIGNALS
VIDEO DETECTOR DIODES FOR COUNTERMEASURES EQUIPMENT,
AD-434 700 DIV. 8

DIRECTION FINDING
ANTENNAS
USE OF THE BEVERAGE ANTENNA IN WIDE APERTURE HIGH FREQUENCY DIRECTION FINDING, PART IV: THEORY,
AD-434 352 DIV. 8

DIRECTION FINDING
RADIO RECEIVERS
COMPARISON OF TECHNICAL SPECIFICA-TIONS FOR THREE TWIN/TRIPLE CHANNEL HF RECEIVERS,
AD-434 335 DIV. 5

DISCHARGE TUBES
QUARTZ
A STUDY OF RADIATION INDUCED SHOCK WAVES EXTERNAL TO QUARTZ DISCHARGE TUBES AND ASSOCIATED FRACTURE PROBLEMS,
AD-434 325 DIV. 25

DISEASE VECTORS
MEDICAL PERSONNEL
BIONOMICS OF THE STAPHYLOCOCCUS IN THE NASAL CARRIER,
AD-434 268 DIV. 16

DISEASES
PASTEURELLA
DIFFERENTIAL MOLYBDENUM MEDIUM FOR PLAGUE AND PSEUDOTUBERCULOSIS BACTERIA,
AD-434 920 DIV. 16
THE FATE OF PLAGUE BACTERIOPHAGE IN THE ORGANISM OF HEALTHY AND PLAGUE INFECTED GREAT GERBILS AND THE POSSIBLE ROUTES OF ITS TRANSMISSION IN EXPERIMENTAL CONDITIONS,
AD-434 921 DIV. 16

DISKS
MATRIX ALGEBRA
INVESTIGATION OF PLATE AND SHELL MODELS BY MATRICES,
AD-434 846 DIV. 13

DISPLAY SYSTEM
TELEVISION CONVERTERS
BINARY-TO-VIDEO DATA CONVERTER,
AD-434 759 DIV. 8

DISPLAY SYSTEMS
CATHODE RAY TUBES
RESEARCH AND DEVELOPMENT ON TRAVELING IMAGE STORAGE TUBE,
AD-433 860 DIV. 8

DISPLAY SYSTEMS
COMMUNICATION THEORY
INFORMATION TRANSFER IN DISPLAY-CONTROL SYSTEMS,
AD-434 452 DIV. 30

DISPLAY SYSTEMS
CONTROL SYSTEMS
INFORMATION TRANSFER IN DISPLAY-CONTROL SYSTEMS,
AD-434 452 DIV. 30

DISPLAY SYSTEMS
DIODES (SEMICONDUCTOR)
SEMICONDUCTOR MATERIALS,

AD-433 725 DIV. 8

DISPLAY SYSTEMS
OPTICAL IMAGES
MATRIX CONTROLLED DISPLAY DEVICE,
AD-433 502 DIV. 24

DOCUMENTATION
BIBLIOGRAPHIES
SDC RESEARCH DIRECTORATE EXTERNAL PUBLICATIONS 1961 - 1963,
AD-433 837 DIV. 30

DOPPLER NAVIGATION
LASERS
DOPPLER OPTICAL NAVIGATOR,
AD-434 227 DIV. 19

DRUGS
RADIOPROTECTIVE AGENTS
SYNTHESIS OF POTENTIAL ANTIRADIATION DRUGS,
AD-434 058 DIV. 4

DYNAMICS
MATHEMATICAL ANALYSIS
BEHAVIOR OF A SECOND ORDER DYNAMIC SYSTEM WITHOUT DAMPING UNDER THE INFLUENCE OF RANDOM PROCESSES,
AD-434 957 DIV. 28

DYNAMICS
QUANTUM MECHANICS
REMOVAL OF DIVERGENCES IN QUANTUM ELECTRODYNAMICS,
AD-434 498 DIV. 28

EARTHQUAKE RESISTANT STRUCTURES
DESIGN
PLASTIC DESIGN IN HIGH STRENGTH STEEL,
AD-434 271 DIV. 13

ECONOMICS
BANKING
EFFECTS OF INFLATION ON THE COMPOSITION OF THE MONEY SUPPLY,
AD-433 851 DIV. 32

ECONOMICS
INDUSTRIAL PRODUCTION
TRENDS IN CONSUMPTION IN THE SOVIET UNION,
AD-434 817 DIV. 32

EDUCATION
DESIGN
SOME EDUCATIONAL PROBLEMS AND PROSPECTS OF A SYSTEMS APPROACH TO INSTRUCTION,
AD-435 032 DIV. 23

EDUCATION
MODELS (SIMULATIONS)
SOME EDUCATIONAL PROBLEMS AND PROSPECTS OF A SYSTEMS APPROACH TO INSTRUCTION,
AD-435 032 DIV. 23

EDUCATION
TEACHING MACHINES
SOME EDUCATIONAL PROBLEMS AND PROSPECTS OF A SYSTEMS APPROACH TO INSTRUCTION,
AD-435 032 DIV. 23

ELASTIC SHELLS
DEFORMATION
THE PLASTIC RESPONSE TO INTERNAL BLAST LOADING OF MODELS OF OUTER CONTAINMENT STRUCTURES FOR NUCLEAR REACTORS,
AD-433 618 DIV. 20

ELASTICITY
MATHEMATICAL ANALYSIS
BENDING OF AN ELLIPTIC PLATE UNDER A MOMENT AT THE CENTER,
AD-433 477 DIV. 13

ELASTICITY
THEORY
SOLUTION OF PLANE DYNAMIC PROBLEM OF THEORY OF ELASTICITY BY FOURIER SERIES,
AD-434 993 DIV. 28

ELASTOMERS
BORON COMPOUNDS
HIGH-TEMPERATURE OR LOW-TEMPERATUR RESISTING ELASTOMERS CONTAINING BORON,
AD-434 904 DIV. 4
HIGH-TEMPERATURE OR LOW-TEMPERATUR RESISTING ELASTOMERS CONTAINING BORON,
AD-434 905 DIV. 4

ELASTOMERS
SOLID ROCKET PROPELLANT BINDERS
EFFECT OF FILLER CONCENTRATION ON THE VISCOELAS- TIC RESPONSE OF A COMPOSITE SOLID PROPELLANT,
AD-433 612 DIV. 10

ELECTRIC CONNECTORS
SELECTION
PREFERRED PROCEDURES FOR THE SELECTION, APPLICATION, AND HANDLING OF MULTICONTACT ELECTRICAL CONNECTORS,
AD-434 111 DIV. 8

ELECTRIC CURRENTS
MAGNETIC FIELDS
APPROXIMATE CALCULATION OF THE DISTRIBUTION OF CURRENT DURING THE FLOW OF A CONDUCTING LIQUID THROUGH A CHANNEL IN A MAGNETIC FIELD,
AD-434 952 DIV. 9

ELECTRIC DETONATORS
EXPLOSIVES INITIATORS
ESTIMATION OF HIGH AND LOW PROBABILITY EED FUNC- TIONING LEVELS,
AD-434 821 DIV. 22

ELECTRIC FIELDS
EARTH
MAGNETOMETER, PHOTOMETER, AND EARTH OBSERVATIONS AT KIRUNA,
AD-434 778 DIV. 2

ELECTRIC POTENTIAL
MEMBRANES (BIOLOGY)
PERIODIC BEHAVIOR IN CHARGED MEMBRANES AND ITS PHYSICAL AND BIOLOGIAL IMPLICATIONS,
AD-434 307 DIV. 16

ELECTRIC POTENTIAL
STOMACH
IONIC RELATIONSHIPS OF THE BIOELECTROGENIC MECHANISM IN ISOLATED RAT STOMACH,
AD-433 804 DIV. 16

ELECTRIC POWER PRODUCTION
FUEL CELLS
HYDROGEN-OXYGEN PRIMARY EXTRATERRE TRIAL (HOPE) FUEL CELL PROGRAM,
AD-433 856 DIV. 7

ELECTRIC SWITCHES
CONFIGURATION
HIGH POWER FAST FERRITE SWITCHES,
AD-434 541 DIV. 7

ELECTRIC SWITCHES
FERRITES
HIGH POWER FAST FERRITE SWITCHES,
AD-434 541 DIV. 7

ELECTRIC WIRE
POWER
2000 F POWER WIRE FOR AEROSPACE ENVIRONMENT,
AD-434 587 DIV. 7

ELECTRICAL PROPERTIES
NERVOUS SYSTEM
BIOLOGICAL USES OF NONIONIZING RADIATION,
AD-433 659 DIV. 16

ELECTRODES
BATTERIES + COMPONENTS
LITHIUM-NICKEL HALIDE SECONDARY BATTERY INVESTIGATION,
AD-433 616 DIV. 7

ELECTROLUMINESCENCE
DISPLAY SYSTEMS
SEMICONDUCTOR MATERIALS,
AD-433 725 DIV. 8

ELECTROLYTES
STORAGE BATTERIES
LITHIUM ANODE LIMITED CYCLE SECONDARY BATTERY,
AD-433 543 DIV. 7

ELECTROMAGNETIC FIELDS
EXHAUST GASES
COUPLING OF PRESSURE OSCILLATIONS WITH ELECTROMAGNETIC FIELDS IN LARGE ROCKET MOTORS,
AD-433 999 DIV. 28

ELECTROMAGNETIC WAVES
COMPATIBILITY
PROCEEDINGS OF THE NINTH TRI-SERVICE CONFERENCE ON ELECTROMAGNETIC COMPATIBILITY,
AD-434 850 DIV. 8

ELECTROMAGNETIC WAVES
ELECTRIC FIELDS
A SOLUTION OF THE COMPLEX DIELECTRIC EQUATIONS FOR ROCKET EXHAUST MICROWAVE INTERFEROMETRY,
AD-433 724 DIV. 28

ELECTROMAGNETIC WAVES
PROPAGATION
AN EXPERIMENTAL INVESTIGATION OF THE EFFECTS OF RADIATION ON THE PROPOGATION OF ELECTROMAGNETIC SIGNALS IN AIR,
AD-433 774 DIV. 20
HORIZONTAL MAGNETIC DIPOLE IN A CONDUCTING EARTH,
AD-434 775 DIV. 28

ELECTROMAGNETIC WAVES
VERY LOW FREQUENCY
EXTRA LONG WAVES PROPAGATION WITH ROCKETS,
AD-434 771 DIV. 8
PROPAGATION OF VLF WAVES IN HIGHLY CONDUCTING MEDIUM,
AD-434 776 DIV. 2

ELECTRON BEAMS
PRESSURE
PRESSURE DURING EVAPORATION OF A SUBSTANCE IN A BEAM OF RADIATION,
AD-434 942 DIV. 28

ELECTRON DENSITY
PLASMA MEDIUM
DEVELOPMENT OF A LOW-WEIGHT MEASURING APPARATUS FOR ELECTRON DENSITIES IN A PLASMA,
AD-434 894 DIV. 28

ELECTRON GUNS
TRAVELING WAVE TUBES
RESEARCH ON LOW NOISE CATHODE DEVELOPMENT,
AD-434 075 DIV. 8

ELECTRON MICROSCOPY
METALLURGY
RESEARCH CONDUCTED ON SECRETARY OF ARMY RESEARCH AND STUDY FELLOWSHIP TRANSMISSION ELECTRON MICROSCOPY,
AD-434 112 DIV. 17

ELECTRON TRANSITIONS
PROBABILITY
GENERALIZED TABLES FOR THE CALCULATION OF DIPOLE TRANSITION PROBABILITIES IN LS -COUPLING,
AD-434 151 DIV. 28

ELECTRON TUBES
MANUFACTURING METHODS
DEVELOPMENT OF AN IMPROVED JAN 6299,
AD-434 209 DIV. 8

ELECTRON TUBES
MICROWAVE EQUIPMENT
INVESTIGATION OF VARIOUS ACTIVATOR REFRACTORY SUBSTRATE COMBINATIONS,
AD-434 766 DIV. 8

ELECTRONIC EQUIPMENT
FAILURE (MECHANICS)
PHYSICS OF FAILURE IN ELECTRONICS, VOLUME 2,
AD-434 329 DIV. 8

ELECTRONIC SWITCHES
CRYSTAL RECTIFIERS
COMPONENT EVALUATION LABORATORY TEST REPORT: SEMICONDUCTOR DEVICE, DIODE --POWER SWITCH,
AD-433 366 DIV. IDEP
A PRODUCTION ENGINEERING MEASURE FOR THE IMPROVEMENT OF PRODUCTION TECHNIQUES TO INCREASE THE RELIABILITY FOR DIFFUSED SICON CONTROLLED SWITCHES TYPES 2N689,
AD-434 272 DIV. 8

ELECTRONICS
BIBLIOGRAPHIES
PUBLICATIONS PRESENTATIONS AND PATENTS, 1963,
AD-433 739 DIV. 30

ELECTRONICS
RESEARCH PROGRAM ADMINISTRATION
ABSTRACTS OF RESEARCH BEING DONE IN THE FIELD OF ELECTRONIC THEORY,
AD-434 238 DIV. 8

ELECTRONICS
SCIENTIFIC RESEARCH
BRITISH RADAR RESEARCH,
AD-348 436L DIV. 6A

ELECTRONS
HEAT
INVESTIGATION OF HOT ELECTRON EMITTER,
AD-433 894 DIV. 28

ELECTRONS
HEATING
CONCERNING THE WARM-UP OF ELECTRONS OF MOVING PLASMA,
AD-434 959 DIV. 28

ELECTRONS
RECOMBINATION REACTIONS
RECOMBINATION OF MOLECULAR POSITIVE IONS WITH ELECTRONS,
AD-434 907 DIV. 28

ELECTROPLATING
HYDROGEN EMBRITTLEMENT
HYDROGEN EMBRITTLEMENT RESULTING FROM CORROSION, CATHODIC PROTECTION, AND ELECTROPLATING,
AD-434 914 DIV. 17

EMISSIVITY
ELECTRONS
INVESTIGATION OF HOT ELECTRON EMITTER,
AD-433 894 DIV. 28

EMISSIVITY
GALLIUM COMPOUNDS
STRUCTURE OF SPECTRUM OF NATURAL RECOMBINATION RADIATION OF GALLIUM ARSENIDE,
AD-434 943 DIV. 28

ENDOCRINE GLANDS
METABOLISM
ENDOCRINE AND METABOLIC EFFECTS OF SHORT-DURATION HYPEROXIA,
AD-434 424 DIV. 16

ENERGY CONVERSION
FUEL CELLS
HYDROGEN-OXYGEN PRIMARY EXTRATERRE TRIAL (HOPE) FUEL CELL PROGRAM,
AD-433 856 DIV. 7

ENERGY CONVERSION
MAGNETOHYDRODYNAMICS
INVESTIGATION OF NON-EQUILIBRIUM IONIZATION FOR MHD ENERGY CONVERSION,
AD-434 574 DIV. 28

ENGINEERING
SCIENTIFIC RESEARCH
DIVISION 7, ENGINEERING,
AD-433 601 DIV. 30

ENGINEERING GEOLOGY
SWAMPS
A REVIEW OF MUSKEG AND ITS ASSOCIATED ENGINEERING PROBLEMS,
AD-434 077 DIV. 13

ENVIRONMENTAL TESTS
AIR FORCE EQUIPMENT
THE AIR FORCE WEAPON SYSTEM ENVIRONMENTAL PROGRAM,
AD-433 882 DIV. 30

ENZYMES
CORROSION
ACTIVITIES OF HYDROGENASE IN MARINE ENVIRONMENTS AND THE CORROSION OF IRON,
AD-433 549 DIV. 16

EPITAXIAL GROWTH
SEMICONDUCTORS
EPITAXIAL VAPOR GROWTH OF III-V COMPOUNDS,
AD-434 756 DIV. 25

EPITAXIAL GROWTH
THIN FILMS
VACUUM EVAPORATED AND CATHODIC SPUTTERED THIN FILMS,
AD-433 828 DIV. 25

EQUATIONS
NUMERICAL ANALYSIS
NUMERICAL EVALUATION OF INTEGRALS AND SOLUTIONS OF INTEGRAL EQUATIONS,
AD-433 947 DIV. 13

EQUATORIAL ORBIT TRAJECTORIES
TRACKING
A SYSTEMATIC APPROACH TO THE CHOICE OF STATION LOCATIONS FOR LOW-ALTITUDE SATELLITE TRACKING IN NEAR EQUATORIAL ORBITS,
AD-433 753 DIV. 12

ERRORS
SCANNING
EXPERIMENTAL RESULTS CONCERNING THE CONICAL SCANNING ERROR SIGNAL OF A BROAD-BAND ANTENNA SYSTEM,
AD-433 489 DIV. 8

ERRORS
STATISTICAL ANALYSIS
OPTIMIZING STATISTICAL ANALYSIS: DATA SCREENING AND PRECONDITIONING,
AD-433 551 DIV. 30

EXHAUST GASES
MAGNETIC FIELDS
COUPLING OF PRESSURE OSCILLATIONS WITH ELECTROMAGNETIC FIELDS IN LARGE ROCKET MOTORS,
AD-433 999 DIV. 25

EXHAUST GASES
THERMODYNAMICS
STUDY OF ROCKET ENGINE EXHAUST PRODUCTS,
AD-433 853 DIV. 10

EXPERIMENTAL DATA
REVIEWS
LITERATURE REVIEW OF EXPERIMENTAL DESIGN THROUGH 1949,
AD-433 913 DIV. 30

EXPLODING WIRES
RESISTANCE (ELECTRICAL)
RESISTANCE VARIATION OF EXPLODING WIRES,
AD-434 709 DIV. 25

EXPLOSIONS
CLAY
CONCERNING DEPENDENCE OF AMPLITUDE OF SEISMIC OSCILLATIONS ON WEIGHT OF CHARGE,
AD-434 941 DIV. 2

EXPLOSIONS
PROBABILITY
PROBABILITY OF PREVENTION OF EXPLOSIVE PROPAGATION AND PERSONNEL INJURY BY PROTECTIVE WALLS,
AD-433 953 DIV. 22

EXPLOSIVE ACTUATORS
STABILITY
SHELF AND SERVICE LIFE TEST ON M-4 DIMPLE MOTOR, PART NUMBER 147740, AIM-4A/4C/26A/26B,
AD-433 819 DIV. 22

EXPLOSIVE INITIATORS
ELECTRIC SWITCHES
DESIGN OBJECTIVES AND DESIGN TESTS OF MINIATURE SQUIB-ACTUATED SWITCH,
AD-435 018 DIV. 22

EXPLOSIVE INITIATORS
PERFORMANCE (ENGINEERING)
EVALUATION OF LOW TEMPERATURE TEST PROCEDURES FOR ELECTROEXPLOSIVE DEVICES,
AD-434 831 DIV. 22

EXPLOSIVE MATERIALS
DETONATIONS
INVESTIGATION OF THE DETONATION OF CONDENSED EXPLOSIVES,
AD-433 493 DIV. 22
EXPERIMENTAL DETERMINATION OF THE EXPONENT OF POLITROPIC PRODUCTS OF DETONATION FOR CERTAIN LIQUID EXPLOSIVES,
AD-434 955 DIV. 22

EXPLOSIVE MATERIALS
SAFETY
GROUND SAFETY! EXPLOSIVE SAFETY HANDBOOK,
AD-434 447 DIV. 22

EXPLOSIVE MATERIALS
SHOCK WAVES
CONCERNING A DEVICE FOR THE DETONATION OF LIQUID EXPLOSIVES,
AD-434 956 DIV. 22

EXPLOSIVES INITIATORS
HAZARDS
GUIDED MISSILE PROPULSION SYSTEM HAZARDS OF ELECTROMAGNETIC RADIATION TO ORDNANCE (HERO) RF CHARACTERISTICS OF ELECTRO-EXPLOSIVE DEVICES,
AD-435 017 DIV. 22

EXPLOSIVES INITIATORS
VULNERABILITY
CONSIDERATIONS OF THE VULNERABILITY OF ELECTRICALLY INITIATED EXPLOSIVE SYSTEMS,
AD-434 126 DIV. 22

EXPOSURE
LABORATORY ANIMALS
EFFECT OF COLD EXPOSURE ON THE ACTION OF MORPHINE IN RATS AND MICE,
AD-434 079 DIV. 16

EXPOSURE METERS
NOISE
EXPERIMENTAL INVESTIGATION OF A PROTOTYPE NOISE EXPOSURE METER,
AD-434 404 DIV. 25

EXTRATERRESTRIAL RADIO WAVES
DETECTION
OBSERVATIONS OF THE OWENS VALLEY RADIO OBSERVA- TORY, THE SPECTRA OF NON-THERMAL RADIO SOURCES,
AD-434 038 DIV. 2

FACTOR ANALYSIS
PSYCHOLOGY
THREE-WAY FACTOR ANALYSIS OF A MULTITRAIT-MULTIMETHOD MATRIX,
AD-434 211 DIV. 28

FAILURE (MECHANICS)
METALS
FRACTURE OF METALS,
AD-435 021 DIV. 17

FAILURE (MECHANICS)
PROBABILITY
USE OF FAILURE STATISTICS IN DESIGN,
AD-433 596 DIV. 26

FAILURE (MECHANICS)
SEMICONDUCTORS
FAILURE MECHANISMS IN SILICON SEMICONDUCTORS,
AD-434 762 DIV. 8

FAILURE (MECHANICS)
SYMPOSIA
PHYSICS OF FAILURE IN ELECTRONICS, VOLUME 2,
AD-434 329 DIV. 8

FAST NEUTRONS
RADIOBIOLOGY
THE BIOLOGICAL ACTION OF HIGH ENERGY FAST NEUTRONS AND PROTONS,
AD-433 529 DIV. 16

FERMIONS
MAGNETIC FIELDS
FOUNDATIONAL RESEARCH PROJECTS OCTOBER-DECEMBER 1963,
AD-433 998 DIV. 8

FERRITES
ELECTRIC SWITCHES
HIGH POWER FAST FERRITE SWITCHES,
AD-434 541 DIV. 7

FERRITES
FILMS
MINIATURE THIN FILM INDUCTORS (MODIFICATION NO. 2),
AD-434 051 DIV. 8

FERRITES
SYNTHESIS (CHEMISTRY)
DEVELOPMENT OF A FERRITE MATERIAL FOR A HIGH- POWER PHASE SHIFTER AT S-BAND,
AD-433 657 DIV. 8

FERROELECTRIC MATERIALS
BIBLIOGRAPHIES
FERROELECTRIC BIBLIOGRAPHY SUPPLEMENT,
AD-433 653 DIV. 14

FERROMAGNETIC MATERIALS
MAGNETIC FIELDS
INVESTIGATION OF MICROWAVE NON-LINEAR EFFECTS UTILIZING FERROMAGNETIC MATERIALS,
AD-433 873 DIV. 25

FERROMAGNETIC MATERIALS
SCIENTIFIC RESEARCH
RESEARCH IN FERROMAGNETICS,
AD-434 045 DIV. 25

FIBERS (SYNTHETIC)
MECHANICAL PROPERTIES
EFFECT OF GLASS FORM ON STRENGTH,
AD-433 806 DIV. 14

FIELD THEORY
EQUATIONS
A SOLUTION OF EINSTEIN'S FIELD EQUATIONS FOR A ROTATING, STATIONARY, AND DUST-FILLED UNIVERSE,
AD-433 478 DIV. 25

FILAMENT WOUND CONSTRUCTION
OPTIMIZATION
OPTIMUM CONSTRUCTION OF REINFORCED PLASTIC CYLINDERS SUBJECTED TO HIGH EXTERNAL PRESSURE,
AD-433 652 DIV. 14

FILAMENT WOUND CONSTRUCTION
ROCKET CASES
DEVELOPMENT OF HIGH-STRENGTH IMPREGNATED ROVING FOR FILAMENT WINDING,
AD-434 280 DIV. 14
DEVELOPMENT OF HIGH-STRENGTH IMPREGNATED ROVING FOR FILAMENT WINDING,
AD-435 034 DIV. 14

FILAMENTS
BORON
A STUDY OF HIGH MODULUS, HIGH STRENGTH FILAMENT MATERIALS BY DEPOSITION TECHNIQUES,
AD-433 501 DIV. 14

FILTERS (FLUID)
MEMBRANES
A COMPATIBILITY EVALUATION OF PLASTIC MEMBRANE FILTERS WITH LIQUID PROPELLANTS AND SOLVENTS,
AD-434 592 DIV. 10
MEASUREMENT OF M15 ELEVATION QUADRANT COUNTER SHAFT SPEED UNDER LABORATORY CONDITIONS,
AD-434 140 DIV. 22

FIXED CAPACITORS
MICROMINIATURIZATION (ELECTRONICS)
LOW-COST MICROCIRCUITS FOR MICROASSEMBLIES,
AD-433 891 DIV. 8

FIXED RESISTORS
MICROMINIATURIZATION (ELECTRONICS)
LOW-COST MICROCIRCUITS FOR MICROASSEMBLIES,
AD-433 891 DIV. 8

FLAMETHROWER FUELS
INCENDIARY GELS
INVESTIGATION OF ALKYL ALUMINUM COMPOUNDS,
AD-434 327 DIV. 3

FLAMMABILITY
AEROSOLS
INVESTIGATION OF THE FLASHING OF AEROSOLS,
AD-433 712 DIV. 3

FLARES
PYROTECHNICS
EVALUATION OF NONGASEOUS HIGH ALTITUDE FLARE COMPOSITIONS,
AD-434 664 DIV. 3

FLARES
RADIOMETERS
DESIGN STUDY FOR INFRARED MEASUREMENT OF PYROTECHNIC FLARES,
AD-433 964 DIV. 30

FLASHBLINDNESS
OPTICAL FILTERS
RESEARCH ON TRIPLET STATES AND PHOTOCHROMISM,
AD-434 239 DIV. 4

FLAT PLATE MODELS
ANALYSIS
CIRCULAR PLATES ON ELASTIC, SEALED FOUNDATIONS,
AD-434 084 DIV. 13

FLIGHT CONTROL SYSTEMS
MATHEMATICAL ANALYSIS
ANALYSIS OF MULTILOOP VEHICULAR CONTROL SYSTEMS,
AD-434 799 DIV. 1

FLIGHT PATHS
THUNDERSTORMS
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION PROJECT NO, R-55,
AD-433 911 DIV. 2

FLIGHT TESTING
TELEMETER DATA
TITAN, SCIENTIFIC PASSENGER POD ADDENDUM TO ANNEX FLIGHT TEST DIRECTIVE MISSILE N-33, XSM 688 WS-107A-2 PROGRAM,
AD-434 336 DIV. 12

FLUID FLOW
AERODYNAMIC CHARACTERISTICS
CERTAIN GENERALIZATIONS AND RESULTS OF INVESTIGATING THE THEOREM OF REVERSIBILITY FOR A TRANSIENT MOTION,
AD-434 992 DIV. 9

FLUID FLOW
AMPLIFIERS
DEVELOPMENT OF PURE FLUID MISSILE CONTROL SYSTEM,
AD-434 862 DIV. 1

FLUID FLOW
COMPRESSIBLE FLOW
BOUNDARY LAYER WITH PRESSURE GRADIENT IN COM- PRESSIBLE FLUID FLOW,
AD-433 483 DIV. 9

FLUID MECHANICS
CONTINUUM MECHANICS
MULTIPOLAR CONTINUUM MECHANICS,
AD-434 679 DIV. 25

FLUIDS
CLOCKS
FLUID TIMER FOR ORDNANCE APPLICATIONS,
AD-434 064 DIV. 22

FLUORESCENCE
AEROSOLS
THE FLUORESCENT PARTICLE ATMOSPHERIC TRACER,
AD-434 169 DIV. 3

FLUORESCENCE
SPECTROSCOPY
AN EXPERIMENTAL STUDY OF THE EFFECT OF AN ELECTRIC FIELD ON THE SHARP GREEN FLUORESCENCE TRANSITIONS OF E R IV IN SINGLE CRYSTALLINE FLUORITE,
AD-434 795 DIV. 25

FLUORIDES
CORROSION
CORROSION OF METALLIC MATERIALS IN AQUEOUS SOLUTIONS OF FLUORIDES AT HIGH TEMPERATURES,
AD-434 879 DIV. 17

FLUORINE COMPOUNDS
POLYMERIZATION
PREPARATION AND POLYMERIZATION OF SOME PERFLUORODIENES,
AD-433 087 DIV. 4

FLUTTER
HYDROFOILS
HYDROFOIL FLUTTER SMALL SWEEP ANGLE INVESTIGATION,
AD-434 258 DIV. 9

FLUTTER
PROGRAMMING (COMPUTERS)
A STUDY IN UNDERWATER FLUTTER,
AD-433 061 DIV. 9

FOILS
MATERIAL FORMING
REFRACTORY ALLOY FOIL ROLLING DEVELOPMENT PROGRAM,
AD-434 397 DIV. 17

FOOD
ACCEPTABILITY
A COMPARISON APPROACH TO FOOD ACCEPTANCE,
AD-434 672 DIV. 29

FOREIGN POLICY
COMMAND + CONTROL SYSTEMS
STUDY FOR HYPOTHETICAL NARRATIVES FOR USE IN COMMAND AND CONTROL SYSTEMS PLANNING. VOLUME 1. PROFILES OF THE FUTURE,
AD-434 500 DIV. 32

FOUNDATIONS
STRESSES
A STUDY OF THE DESIGN AND ANALYSIS OF FOUNDATIONS,
AD-433 965 DIV. 13

FOURIER ANALYSIS
SERIES
SOLUTION OF PLANE DYNAMIC PROBLEM OF THEORY OF ELASTICITY BY FOURIER SERIES,
AD-434 993 DIV. 25

FRACTOGRAPHY
ALUMINUM ALLOYS
A REVIEW OF SOME ELECTRON-MICROSC(FRACTOGRAPHIC STUDIES OF ALUMINUM ALLOYS,
AD-434 212 DIV. 17

FRACTOGRAPHY
ELECTRON MICROSCOPY
SOME OBSERVATIONS ON THE ELECTRON-MICROSCOPIC FRACTOGRAPHY OF EMBRITTLED STEELS,
AD-434 987 DIV. 17

FREE RADICALS
CRYOGENICS
RADICAL YIELDS IN IRRADIATED AROMATICS,
AD-434 046 DIV. 4

FREE RADICALS
CYCLOALKANES
A SYNTHESIS OF C3H3+(HYPOTHETICAL)
AD-433 643 DIV. 4

FREE RADICALS
IONIZATION
ELECTRON AFFINITIES OF INORGANIC RADICALS,
AD-434 912 DIV. 4

FREEZING POINT DEPRESSANTS
ADDITIVES
NEW CORROSION INHIBITORS FOR ANTIFREEZES,
AD-433 661 DIV. 14
THE DEVELOPMENT OF AN IMPROVED COOLING SYSTEM CORROSION INHIBITOR,
AD-433 829 DIV. 14

FREQUENCY MULTIPLIERS
X-BAND
FREQUENCY MULTIPLIER,
AD-433 798 DIV. 8

FUEL CELLS
BIOCHEMISTRY
BIOCHEMICAL FUEL CELLS,
AD-434 713 DIV. 16

FUEL CELLS
ION EXCHANGE
STUDY OF THE GENERAL PROPERTIES OF SOME MINERAL ION EXCHANGE MEMBRANES AS WELL AS THEIR POSSIBLE USE IN LOW TEMPERATURE FUEL CELLS,
AD-433 803 DIV. 7

FUEL CELLS
SPACECRAFT
HYDROGEN-OXYGEN PRIMARY EXTRATERRE TRIAL (HOPE) FUEL CELL PROGRAM,
AD-433 856 DIV. 7

FUNCTIONAL ANALYSIS
OPERATORS (MATHEMATICS)
WEAK CONVERGENCE IN CERTAIN SPECIAL BANACH SPACES,
AD-433 476 DIV. 13

GALLIUM COMPOUNDS
ARSENIDES
STRUCTURE OF SPECTRUM OF NATURAL RECOMBINATION RADIATION OF GALLIUM ARSENIDE,
AD-434 943 DIV. 25

GALLIUM COMPOUNDS
SEMICONDUCTORS
EPITAXIAL VAPOR GROWTH OF III-V COMPOUNDS,
AD-434 756 DIV. 25

GAME THEORY
DECISION MAKING
DECISION PROCEDURES FOR FINITE DECISION PROBLEMS UNDER COMPLETE IGNORANCE,
AD-433 878 DIV. 13

GAME THEORY
SEARCH THEORY
PROBLEMS IN PROBABILITY OF A GEOMETRIC NATURE,
AD-434 208 DIV. 13

GAMMA RAYS
SHIELDING
SOMME GAMMA-RAY SHIELDING PROPERTIES OF FINITE STEEL SLABS,
AD-433 658 DIV. 17

GAS ANALYSIS
HIGH-TEMPERATURE RESEARCH
RESEARCH DIRECTED TOWARD THEORETICAL AND EXPERIMENTAL INVESTIGATIONS IN LABORATORY ASTROPHYSICS INVOLVING SHOCK HEATED HIGH TEMPERA- TURE GASES,
AD-434 357 DIV. 30

GAS BEARINGS
CONFIGURATION
ON THE SPIRAL GROOVED, SELF ACTING, GAS BEARING,
AD-433 660 DIV. 24

GAS BEARINGS
THRUST BEARINGS
GROOVED PLATE GAS LUBRICATED THRUST BEARINGS, WITH SPECIAL REFERENCE TO THE SPIRAL GROOVE BEARING,
AD-434 437 DIV. 24

GAS GENERATING SYSTEMS
AZIDES
FEASIBILITY TESTING OF A NITROGEN-GENERATING SOLID CHARCH (SODIUM AZIDE) FOR PROPELLANT TANK PRESSURIZATION,
AD-433 729 DIV. 10

GAS IONIZATION
DUST
SCATTERING OF ELECTRONS AND IONS BY DUST PARTICLES IN A GAS,
AD-433 862 DIV. 28

GAS IONIZATION
ULTRAVIOLET RADIATION
RETARDING POTENTIAL MEASUREMENTS OF ELECTRONS PHOTOEMITTED BY N2, CO, AND O2,
AD-434 028 DIV. 25

GAS TURBINES
AXIAL-FLOW COMPRESSORS
BROADENING OF REGION OF STABLE WORK OF A STAGE OF AN AXIAL COMPRESSOR,
AD-434 944 DIV. 27

GAS TURBINES
DAMPING
STRUCTURAL DAMPING OF OSCILLATIONS OF THIN-WALLED SHELLS OF TYPE OF HOUSING COMPONENTS OF GAS TUR- BINE ENGINES,
AD-434 995 DIV. 1

GASES
ADSORPTION
STUDY OF ADSORPTION OF GASES ON SOLIDS IN THE HIGH VACUUM RANGE,
AD-434 094 DIV. 25

GASES
CLEANING
THE DESIGN AND USE OF DIFFUSION FILL DEVICES IN ULTRA-HIGH VACUUM APPLICATIONS,
AD-434 746 DIV. 25

GASES
COMPRESSIVE PROPERTIES
THE COMPRESSIBILITY EFFECT OF A GAS STREAM ON THE STABILITY OF AN ADJACEN- LIQUID LAYER,
AD-434 717 DIV. 9

GASES
DIFFUSION
A THEORETICAL INVESTIGATION OF DIFFUSION IN RAREFIED GASES,
AD-434 790 DIV. 25

GASES
DYNAMICS
CHARTS OF NORMAL SHOCK WAVE PROPERTIES IN IMPERFECT AIR,
AD-433 958 DIV. 25

GASES
GLOW DISCHARGES
THE STUDY OF IONIC PROCESSES IN GASEOUS AFTERGLOWS,
AD-434 583 DIV. 25

GASES
OSCILLATION
OSCILLATIONS OF A TWO-BAY PANEL IN GAS FLOW,
AD-434 990 DIV. 9

GASES
RESONANCE ABSORPTION
MM-WAVE AMPLIFICATION BY RESONANCE SATURATION IN GASES,
AD-434 764 DIV. 25

GASES
THERMODYNAMICS
THE MICROCANONICAL ENSEMBLE,
AD-433 834 DIV. 25

GASTROPODA
ECOLOGY
SPECIAL ASPECTS OF ENVIRONMENT RESULTING FROM VARIOUS KINDS OF NUCLEAR WARS. PART II. APPENDIX 1-2. HISTORICAL EXAMPLES OF ECOLOGICAL DISASTER (II),
AD-433 784 DIV. 16

GENERATOR
TOWED BODIES
SERVICE SUITABILITY EVALUATION OF GENERATOR DROUGUE LIGHTING KITS FOR THE D-704 AIR RE- FUELING STORE,
AD-434 025 DIV. 7

GENETICS
BACTERIA
TO INVESTIGATE GENETIC INSTABILITY IN BACTERIA, PARTICULARLY WITH RESPECT TO THE PRESENCE OF CONTROLLING EPISOMES,
AD-434 869 DIV. 16

GENETICS
COMMUNICATION THEORY
THE PRINCIPLE OF GENETIC COST,
AD-433 918 DIV. 16

GENETICS
LEARNING
NON-GENETIC CONTROL IN BIOLOGICAL SYSTEMS,
AD-433 848 DIV. 16

GENETICS
MATHEMATICAL ANALYSIS
EXPERIMENTS WITH PATTERNS OF EVOLUTION,
AD-433 855 DIV. 16

GEOPHYSICAL PROSPECTING
SEISMIC WAVES
CONCERNING DEPENDENCE OF AMPLITUDE OF SEISMIC OSCILLATIONS ON WEIGHT OF CHARGE,
AD-434 941 DIV. 2

GLASS
FILAMENTS
EVALUATION OF NATIONAL RESEARCH CORPORATION GLASS MONOFILAMENTS,
AD-433 555 DIV. 14

GLASS TEXTILES
IMPREGNATION
DEVELOPMENT OF HIGH-STRENGTH IMPREGNATED ROVING FOR FILAMENT WINDING,
AD-434 280 DIV. 14

GLASS TEXTILES
MECHANICAL PROPERTIES
EFFECT OF GLASS FORM ON STRENGTH,
AD-433 806 DIV. 14

GLOBAL COMMUNICATION SYSTEMS
MILITARY REQUIREMENTS
UNICOM, UNIVERSAL INTEGRATED COMMUNICATION SYSTEM,
AD-434 182 DIV. 5

GLOW DISCHARGES
GASES
THE STUDY OF IONIC PROCESSES IN GASEOUS AFTERGLOWS,
AD-434 583 DIV. 25

GONIOMETERS
CRYSTAL STRUCTURE
SINGLE CRYSTAL ORIENTER SETTINGS (CDC 1604),
AD-434 156 DIV. 25

GRAPHITE
ELASTICITY
RESEARCH AND DEVELOPMENT ON ADVANCED GRAPHITE MATERIALS, VOLUME XXIII, A METHOD FOR DETERMIN- ING YOUNG'S MODULUS OF GRAPHITE AT ELEVATED TEMPERATURES,
AD-433 488 DIV. 14

GROUND EFFECT MACHINE
WINGS
THE GENERAL CHARACTERISTICS OF WINGED GROUND EFFECT MACHINES,
AD-434 300 DIV. 1

GROUND EFFECT MACHINES
LIFT
VORTEX RECIRCULATION LIFT FOR GROUND EFFECT MACHINES,
AD-433 785 DIV. 1

GROUND SUPPORT EQUIPMENT
CONSTRUCTION
RESEARCH AND EXPERIMENTATION ON SPACE APPLICATIONS OF MILLIMETER WAVES,
AD-434 543 DIV. 8

GROUP DYNAMICS
LEADERSHIP
PREDICTABILITY OF SMALL GROUP LEADERSHIP CRITERIA,
AD-434 864 DIV. 28
AN INVESTIGATION OF THE PRODUCT MOMENT INTERCORRELATIONS AMONG SMALL GROUP LEADERSHIP CRITERIA,
AD-434 865 DIV. 28

GROUP DYNAMICS
PROJECTIVE TECHNIQUES
STRATEGY IN THREE GAMES: A REPLICATION,
AD-433 863 DIV. 28

GROUPS (MATHEMATICS)
TOPOLOGY
INDUCED REPRESENTATIONS WITH APPLICATIONS TO THE SYMMETRIC AND FULL LINEAR GROUPS,
AD-434 666 DIV. 13

GROWTH SUBSTANCES
ALGAE
ACTION OF GIBBERELLIC ACID ON PROTOCOCCALES,
AD-434 937 DIV. 16

GUIDED MISSILE RANGES
SAFETY
A PRELIMINARY TOTAL COST MODEL FOR COMPARING RANGE
AD-434 002 DIV. 12

GUIDED MISSILE SAFETY
SPACE ENVIRONMENTAL CONDITIONS
SOME EFFECTS OF THE NATURAL ENVIRONMENT ON AERO- SPACE SYSTEMS,
AD-434 324 DIV. 12

GUIDED MISSILE SAFETY
TERMINAL BALLISTICS
PROBABILITY MODEL FOR IMPACTING DEBRIS,
AD-434 199 DIV. 12

GUIDED MISSILE TRACKING SYSTEMS
ERRORS
RELATIVE ACCURACY OF AZUSA AND DOWNRANGE GLOTRAC AT A POINT OF OVERLAPPING COVERAGE,
AD-433 049 DIV. 6

GUIDED MISSILE TRAJECTORIES
MEASUREMENT
AN APPROXIMATE METHOD FOR OPTICAL TRAJECTORY REDUCTION,
AD-434 270 DIV. 12

GUIDED MISSILES
VIBRATION
SHOCK, VIBRATION AND ASSOCIATED ENVIRONMENTS, PART IV,
AD-433 726 DIV. 12

GUIDED MISSILES (SURFACE-TO-SURFACE)
SPECIFICATIONS
ACCEPTANCE SUMMARY REPORT, FTM 436 MODEL SPECI- FICATION S-133-1000-0-1,
AD-433 084 DIV. 12

HALL EFFECT
GENERATORS
STABILITY OF NULL VOLTAGE OF HALL GENERATORS FOR DIGITAL TRANSDUCER READOUT HEADS,
AD-434 401 DIV. 8

HALL EFFECT
NON-DESTRUCTIVE TESTING
INVESTIGATION OF HALL-EFFECT DEVICES FOR FLAW DETECTION IN METALS,
AD-433 895 DIV. 30

HALOCARBON PLASTICS
AGING (MATERIALS)
IMPROVEMENT OF HIGH TEMPERATURE PROPERTIES OF A FLUOROELASTOMER,
AD-434 350 DIV. 14

HALOCARBON PLASTICS
SURFACE PROPERTIES
HYDROPHOBIC AND OLEOPHOBIC FLUOROPOLYMER COATINGS OF EXTREMELY LOW SURFACE ENERGY,
AD-434 213 DIV. 14
PREPARATION AND POLYMERIZATION OF SOME PERFLUORODIENES,
AD-433 087 DIV. 4

HALOGENATED HYDROCARBONS
IODINE COMPOUNDS
A SYNTHESIS OF C3H3+(HYPOTHETICAL)
AD-433 643 DIV. 4

HANDBOOKS
ATHENA DOCUMENTATION HANDBOOK,
AD-434 167 DIV. 12

HANDBOOKS
CRYSTAL OSCILLATORS
QUARTZ CRYSTAL OSCILLATOR CIRCUITS STUDY,
AD-433 816 DIV. 8

HANDBOOKS
DESIGN
HIGH POWER, HIGH VOLTAGE, AUDIO FREQUENCY TRANSFORMER DESIGN MANUAL,
AD-434 354 DIV. 7

HANDBOOKS
EXPLOSIVE MATERIALS
GROUND SAFETY: EXPLOSIVE SAFETY HANDBOOK,
AD-434 447 DIV. 28

HAZARDS
ELECTROMAGNETIC WAVES
GUIDED MISSILE PROPULSION SYSTEM HAZARDS OF ELECTROMAGNETIC RADIATION TO ORDNANCE (HERO) RF CHARACTERISTICS OF ELECTRO- EXPLOSIVE DEVICES,
AD-433 017 DIV. 28

HEAT
DAMAGE
STUDY OF COMPREHENSIVE FAILURE THEORY,
AD-434 794 DIV. 8

HEAT TRANSFER
MEASUREMENT
THE EFFECTS OF MAGNETIC FIELDS ON A FLOWING PLASMA,
AD-434 097 DIV. 25

HEAT TRANSFER
METALS
INTERMITTENT HEAT CONDUCTION INTO A METAL SLAB, PART I, ANALYSIS, PART II, NUMERICAL CALCULATION,
AD-434 052 DIV. 25

HEATING ELEMENTS
CATAPULTS
INVESTIGATION OF 70-30 COPPER-NICKEL CATAPULT TROUGH HEATER TUBING,
AD-433 858 DIV. 31

HEAT-RESISTANT METALS + ALLOYS
IMPURITIES
INFLUENCE OF PURITY OF A METAL-BASE ON THE HEAT RESISTANCE OF AN ALLOY,
AD-434 989 DIV. 17

HEAT-RESISTANT PLASTICS
AGING (MATERIALS)
IMPROVEMENT OF HIGH TEMPERATURE PROPERTIES OF A FLUOROELASTOMER,
AD-434 350 DIV. 14

HEAT-RESISTANT PLASTICS
BORON COMPOUNDS
HIGH-TEMPERATURE OR LOW-TEMPERATUF RESISTING ELASTOMERS CONTAINING BORON,
AD-434 904 DIV. 4

HEAT-RESISTANT PLASTICS
SYNTHESIS (CHEMISTRY)
SYNTHESIS OF POLYMERIC POLYDIOXYARYLENEPHOSPHONITRYLATES,
AD-433 578 DIV. 4

HEAT-RESISTANT PLASTICS
VINYL PLASTICS
HIGH-TEMPERATURE OR LOW-TEMPERATUF RESISTING ELASTOMERS CONTAINING BORON,
AD-434 905 DIV. 4

HELICOPTERS
AIRFRAMES
STATIC TEST PROGRAM FOR CH-47A HELICOPTER,
AD-433 586 DIV. 1

HELICOPTERS
AVIATION ACCIDENTS
CH-21A HELICOPTER AIRFRAME DEFORMATION UNDER A DYNAMIC CRASH CONDITION,
AD-433 603 DIV. 1

HELICOPTERS
DRONES
EVALUATION OF THE OH-50C DRONE HELICOPTER,
AD-434 039L DIV. 1A

HELICOPTERS
FLIGHT TESTING
AN EVALUATION OF THE EFFECTS OF ALTITUDE ON THE HEIGHT VELOCITY DIAGRAM OF A SINGLE ENGINE HELICOPTER,
AD-433 703 DIV. 1

HEMATOLOGY
RADIATION EFFECTS
HEMATOLOGICAL CHANGES IN BEAGLES AFTER IRRADIATION BY NEUTRONS, X-RAY, AND RADIONUCLIDES
AD-433 980 DIV. 16

HIGH ALTITUDE
CARDIOVASCULAR SYSTEM
EFFECT OF CHRONIC HYPOXIA UPON THE CIRCULATION,
AD-433 546 DIV. 16

HIGH ALTITUDE
PHYSIOLOGY
TRANSIENT CHANGES IN ARTERIAL LACTIC ACID OF DOGS AT 21,000 FEET,
AD-434 870 DIV. 16

HIGH EXPLOSIVE AMMUNITION
FIRING TESTS (ORDNANCE)
TEST FIRING 20MM AMMUNITION, HEI FOR MAP GERMANY,
AD-433 020 DIV. 22

HIGH-TEMPERATURE RESEARCH
PHYSICS
PROBLEMS OF HIGH-TEMPERATURE THERMOPHYSICS,
AD-433 534 DIV. 25

HMX
ADSORPTION
GAS ADSORPTION ON AN ORGANIC SURFACE: HMX,
AD-434 285 DIV. 4

HORMONES
PHYSIOLOGY
ISOLATION, IDENTIFICATION AND PHYSIOLOGY OF A POSTULATED HORMONE CAPABLE OF INDUCING EXCRETION OF SODIUM,
AD-433 770 DIV. 16

HYDROCARBONS
CHEMICAL REACTIONS
CHEMI-IONIZATION AND CHEMILUMINES- CENCE IN THE RE-ACTION OF ATOMIC OXYGEN WITH C2H2, C2D2, AND C2H4,
AD-434 982 DIV. 4

HYDRODYNAMICS
LINEAR SYSTEMS
APPLICATION OF LINEAR SUPERPOSITIC TECHNIQUES TO THE ROLL RESPONSE OF A SHIP MODEL IN IRREGU- LAR BEAM SEAS,
AD-433 793 DIV. 9

HYDRODYNAMICS
WATER WAVES
HEAVING FORCES AND PITCHING MOMENTS ON A SEMISUBMERGED AND RESTRAINED PROLATE SPHEROID PROCEEDING IN REGULAR HEAD WAVES,
AD-433 790 DIV. 9

HYDROGEN
SHIELDING
DEPENDENCE OF NEUTRON ALBEDOS UPON HYDROGEN CONTENT OF A SHIELD,
AD-433 735 DIV. 26

HYDROGEN
TRANSPORT PROPERTIES
TRANSPORT PROPERTIES OF NITROGEN, HYDROGEN, OXY- GEN, AND AIR TO 30,000 K,
AD-433 053 DIV. 2

HYDROGEN COMPOUNDS
CHEMICAL BONDS
ENHANCEMENT OF P-H BONDING IN A PHOSPHINE BORINE,
AD-434 269 DIV. 4

HYDROGEN EMBRITTLEMENT
MATHEMATICAL ANALYSIS
HYDROGEN EMBRITTLEMENT RESULTING FROM CORROSION, CATHODIC PROTECTION, AND ELECTROPLATING,
AD-434 914 DIV. 17

HYDROPHONES
SIGNAL-TO-NOISE RATIO
SPACE-TIME CORRELATION FUNCTION OF SURFACE GENERATED NOISE AND APPLICATION TO A HYDRO- PHONE ARRAY PROBLEM,
AD-433 523 DIV. 6

HYGROMETERS
DESIGN
MODIFICATION AND TESTING OF THE TEMPERATURE- HUMIDITY MEASURING SET AN/TMQ-11(A),
AD-434 792 DIV. 30

HYPERSONIC DIFFUSERS
HYPERSONIC WIND TUNNELS
AN EXPERIMENTAL STUDY OF DIFFUSERS IN AN OPENJET, LOW-DENSITY, HYPERSONIC WIND TUNNEL,
AD-434 380 DIV. 30

HYPERSONIC FLOW
LAMINAR BOUNDARY LAYER
SOME EXPERIMENTS ON HYPERSONIC SEPARATED FLOWS,
AD-433 617 DIV. 9A

HYPERSONIC FLOW
REVIEWS
RESEARCH ON HYPERSONIC FLOW,
AD-433 737 DIV. 9

HYPERSONIC TEST VEHICLES
DOCUMENTATION
ATHENA DOCUMENTATION HANDBOOK,
AD-434 167 DIV. 18

HYPERSONIC WIND TUNNELS
HYPERSONIC DIFFUSERS
AN EXPERIMENTAL STUDY OF DIFFUSERS IN AN OPENJET, LOW-DENSITY, HYPERSONIC WIND TUNNEL,
AD-434 380 DIV. 30

HYPERSONIC WIND TUNNELS
WIND TUNNEL NOZZLES
EVALUATION OF THROAT MATERIALS IN THE HOTSHOT TUNNEL F
AD-433 670 DIV. 30

HYPERVELOCITY PROJECTILES
TERMINAL BALLISTICS
THEORETICAL HYPERVELOCITY IMPACT CALCULATIONS USING THE PICWICK CODE,
AD-434 220 DIV. 12

HYPOXIA
BLOOD CIRCULATION
EFFECT OF CHRONIC HYPOXIA UPON THE CIRCULATION,
AD-433 546 DIV. 16

ICE
LAKES
FORMATION OF LAKE ICE IN A TEMPERATE CLIMATE,
AD-433 794 DIV. 2

ICE
SEA WATER
THE ELECTRICAL PROPERTIES OF SALINE ICE,
AD-434 346 DIV. 2

IMMUNITY
MEDICAL RESEARCH
SELECTED ARTICLES FROM ZHURNAL MIKROBIOLOGII, EPIDEMIOLOGII I IMMUNOBIOLOGII VOL 40, NO. 7, 1963,
AD-434 298 DIV. 16

IMMUNITY
NEOPLASMS
THE EFFECT OF ACUTE EXPOSURE TO 2 DEGREES C ON HOST RESISTANCE TO EHRLICH ASCITES TUMOR,
AD-434 080 DIV. 16

IMPURITIES
ALUMINUM ALLOYS
MINOR ALLOY ADDITIONS TO ALUMINUM ALLOY MELTS,
AD-434 214 DIV. 17

IMPURITIES
HEAT-RESISTANT METALS + ALLOYS
INFLUENCE OF PURITY OF A METAL-BASE ON THE HEAT RESISTANCE OF AN ALLOY,
AD-434 989 DIV. 17

INCENDIARY AMMUNITION
FIRING TESTS (ORDNANCE)
TEST FIRING 20MM AMMUNITION, HEI FOR MAP GERMANY,
AD-435 020 DIV. 22

INCENDIARY GELS
FLAMETHROWER FUELS
INVESTIGATION OF ALKYL ALUMINUM COMPOUNDS,
AD-434 327 DIV. 3

INDEXES
DICTIONARIES
SHARE DIGITAL SIMULATION GLOSSARY,
AD-433 515 DIV. 30

INDEXES
DOCUMENTATION
SDC RESEARCH DIRECTORATE EXTERNAL PUBLICATIONS 1961 - 1963,
AD-433 837 DIV. 30

INDEXES
RADIATION EFFECTS
MONTHLY ACCESSION LIST COORDINATE INDEX PART II,
AD-434 601 DIV. 14

INDEXES
RADIATION HAZARDS
AN INDEX TO U.S. NAVAL RADIOLOGICAL DEFENSE LABORATORY TECHNICAL REPORTS (YR SERIES) ISSUED FROM 1 JANUARY THROUGH 31 DECEMBER 1963,
AD-433 928 DIV. 20

INDUSTRIAL PROCUREMENT
MATHEMATICAL ANALYSIS
SOME ORDER STATISTICS RELATING TO MARKOV CHAINS! AN APPLICATION TO PURCHASING POLICIES,
AD-433 690 DIV. 24

INDUSTRIAL PRODUCTION
CONTROL SYSTEMS
TECHNIQUES FOR ECONOMIC CONTROL CHART OPERATION,
AD-433 648 DIV. 32

INFORMATION RETRIEVAL
COMPUTERS
STARSHINE PROGRAM FOR STORAGE, RETRIEVAL, AND ANALYSIS OF SHOCK-DAMAGE INFORMATION,
AD-433 795 DIV. 31

INFRARED DOMES
MATERIALS
LONG WAVELENGTH INFRARED DOMES,
AD-433 950 DIV. 14

INFRARED EQUIPMENT
SPECTRUM ANALYZERS
DIRECT RECORDING OF INTEGRATED BAND INTENSITIES FROM A LINEAR WAVELENGTH SPECTROMETER,
AD-433 598 DIV. 25

INFRARED OPTICAL MATERIALS
MATERIAL FORMING
LONG WAVELENGTH INFRARED DOMES,
AD-433 950 DIV. 14

INFRARED RADIATION
ENERGY
INFRARED - TODAY AND TOMORROW,
AD-434 358 DIV. 25

INFRARED RADIATION
ROCKET MOTORS (SOLID PROPELLANT)
INTERNAL ENVIRONMENT OF SOLID ROCKET NOZZLES,
AD-434 129 DIV. 27

INFRARED RADIATION
SCIENTIFIC RESEARCH
RESEARCH IN THE FAR INFRARED REGION OF THE SPECTRUM,
AD-434 770 DIV. 25

INFRARED RESEARCH
ASTROPHYSICS
INFRARED TECHNOLOGY AND AEROSPACE SYSTEMS,
AD-434 323 DIV. 12

INSECTICIDES
NERVOUS SYSTEM
CENTRAL NERVOUS SYSTEM EFFECTS OF CHRONIC EX- POSURE TO ORGANOPHOSPHATE INSECTICIDES,
AD-434 090 DIV. 16

INSECTS
BIBLIOGRAPHIES
CURRENT REFERENCES IN MEDICAL ENTOMOLOGY FROM RUSSIAN, CENTRAL AND EASTERN EUROPEAN, AND CHINESE LITERATURE, VOLUME III, NO. 4,
AD-433 870 DIV. 16

INSTRUCTION MANUALS
MANUFACTURING METHODS
PROCESS AND FLOW CHART MANUAL FOR INTERDIGITATED SILICON TRANSISTOR PROGRAM,
AD-434 351 DIV. 8

INTEGRAL EQUATIONS
NUMERICAL METHODS AND PROCEDURES
NUMERICAL EVALUATION OF INTEGRALS AND SOLUTIONS OF INTEGRAL EQUATIONS,
AD-433 947 DIV. 15

INTERFERENCE
ATMOSPHERIC PRECIPITATION
COMPARISON OF PRECIPITATION AND TROPOSPHERIC SCATTERING CROSS SECTIONS,
AD-434 836 DIV. 5

INTERFEROMETERS
MICROWAVE FREQUENCY
A SOLUTION OF THE COMPLEX DIELECTRIC EQUATIONS FOR ROCKET EXHAUST MICROWAVE INTERFEROMETRY,
AD-433 729 DIV. 25

IODINE
RECOMBINATION REACTIONS
FURTHER STUDIES OF IODINE ATOM RECOMBINATION,
AD-434 714 DIV. 4

ION EXCHANGE
MEMBRANES
STUDY OF THE GENERAL PROPERTIES OF SOME MINERAL ION EXCHANGE MEMBRANES AS WELL AS THEIR POSSIBLE USE IN LOW TEMPERATURE FUEL CELLS,
AD-433 803 DIV. 7

ION SOURCES
PULSE GENERATORS
HIGH-VOLTAGE PULSE MODE OF IONIC SOURCE PENNING,
AD-434 960 DIV. 25

ION SOURCES
VIBRATORS (ELECTRICAL)
VACUUM VIBRATOR ION SOURCE,
AD-434 675 DIV. 30

IONIZATION
MAGNETOHYDRODYNAMICS
INVESTIGATION OF NON-EQUILIBRIUM IONIZATION FOR MHD ENERGY CONVERSION,
AD-434 574 DIV. 28

IONIZATION
SURFACES
THE ROLE OF ALUMINUM AND ITS OXIDES AS SOURCES OR MODERATORS OF ELECTRONS IN SOLID PROPELLANT ROCKET EXHAUSTS,
AD-434 699 DIV. 25

IONIZATION
THEORY
MECHANISM OF CESIUM IONIZATION,
AD-434 814 DIV. 4

IONOSPHERIC DISTURBANCES
RADIO SIGNALS
HF COMMUNICATION EFFECTS SIMULATION! INSTRUMENTATION AND OPERATION OF THE FIELD EXPERIMENT,
AD-434 554 DIV. 5

IONOSPHERIC PROPAGATION
HIGH FREQUENCY
HF COMMUNICATION EFFECTS SIMULATION! COMPARISON OF THE FORT MONMOUTH/PALO ALTO CIRCUIT PERFORMANCE WITH COMPUTER PREDICTIONS,
AD-434 579 DIV. 8

IONOSPHERIC PROPAGATION
SCATTERING
BACKSCATTER OF RADIO WAVES FROM GROUND AND SEA,
AD-434 680 DIV. 8

IONS
FREE RADICALS
ELECTRON AFFINITIES OF INORGANIC RADICALS,
AD-434 912 DIV. 4

IONS
RECOMBINATION REACTIONS
RECOMBINATION OF MOLECULAR POSITIVE IONS WITH ELECTRONS,
AD-434 907 DIV. 25

IRON
CORROSION
DISSOLUTION RATES OF ZONE REFINED IRON AND STEEL IN HCL, H2SO4 AND NACL AQUEOUS SOLUTIONS,
AD-434 230 DIV. 4

IRON
DIFFUSION
STUDY OF INFLUENCE OF REFRACTORY ELEMENTS ON THE SELF-DIFFUSION OF IRON WITH THE HELP OF RADIOACTIVE ISOTOPES,
AD-434 939 DIV. 17

IRON
MAGNETIC PROPERTIES
BARKHAUSEN EFFECT IN IRRADIATED PURE IRON AND NICKEL,
AD-433 849 DIV. 25

IRON ALLOYS
DIFFUSION
DIFFUSION IN B.C.C. METALS,
AD-434 751 DIV. 17

IRON ALLOYS
TRANSFORMATIONS
INFLUENCE OF ALLOYING ELEMENTS ON THE CONTINUOUS COOLING TRANSFORMATION AND WELDABILITY OF BINARY AND TERNARY ALLOYS OF IRON,
AD-434 008 DIV. 17

ISOMERIC TRANSITIONS
MICROWAVE SPECTROSCOPY
THE MASS AND MICROWAVE SPECTRA, STRUCTURES AND DIPOLE MOMENTS OF THE ISOMERS OF SULFURMONO-FLUORIDE,
AD-434 344 DIV. 25

JET FIGHTERS
TOWED BODIES
STRENGTH ANALYSIS OF THE NAVAIRDEVCEN C.G. TARGET LAUNCHER,
AD-434 302 DIV. 1

JOB ANALYSIS
MEDICAL PERSONNEL
PERFORMANCE EVALUATION OF APPRENTICE MEDICAL MATERIEL SPECIALISTS,
AD-434 041 DIV. 28

KLEBSIELLA
MICE
EFFECT OF ACCLIMATIZATION TO 2 C ON HOST SUSCEPTIBILITY TO KLEBSIELLA PNEUMONIAE CHALLENGE,
AD-434 114 DIV. 16

KLYSTRONS
PRODUCTION
HIGH POWER X-BAND GENERATOR,
AD-433 704 DIV. 8

L BAND
OSCILLATORS
AN L-BAND TUNNEL DIODE OSCILLATOR,
AD-434 553 DIV. 8

LABOR
ANALYSIS
SOME PROPERTIES OF SCHEDULES FOR LARGE PROJECTS WITH LIMITED RESOURCES,
AD-435 050 DIV. 28

LABOR
SCHEDULING
SOME PROPERTIES OF SCHEDULES FOR LARGE PROJECTS WITH LIMITED RESOURCES,
AD-435 050 DIV. 28

LABORATORY EQUIPMENT
MEASUREMENT
ADSORPTION - DESORPTION PROPERTIES OF SORBENTS,
AD-434 980 DIV. 4

LACTIC ACID
BLOOD CIRCULATION
TRANSIENT CHANGES IN ARTERIAL LACTIC ACID OF DOGS AT 21,000 FEET,
AD-434 870 DIV. 16

LAMINAR BOUNDARY LAYER
AERODYNAMIC CHARACTERISTICS
SUMMARY OF LAMINAR LNV CONTROL TECHNIQUES NR AIRCRAFT,
AD-434 841 DIV. 9

LAMINAR BOUNDARY LAYER
SUPERSONIC CHARACTERISTICS
LAMINARY BOUNDARY LAYER ON A POROUS SURFACE,
AD-434 976 DIV. 9

LAMINAR BOUNDARY LAYER
VORTICES
ON THE INFLUENCE OF VORTICITY OF EXTERNAL FLOW AND CURVATURE OF BODY ON FLOW IN BOUNDARY LAYER,
AD-434 977 DIV. 9

LAMINAR FLOW
NUMERICAL ANALYSIS
AN EXACT ANALYSIS OF LAMINAR FLOW IN THE ENTRANCE REGION OF AN ANNULAR PIPE,
AD-433 880 DIV. 9

LANDING CRAFT
PROPELLERS (MARINE)
PROPULSION CHARACTERISTICS OBTAINED WITH VERTICAL AXIS PROPELLERS FOR LCU (A) REPRESENTED BY MODEL 4952,
AD-434 581 DIV. 31
RESISTANCE CHARACTERISTICS OBTAINED WITH VERTICAL AXIS PROPELLERS FOR LCU(A) REPRESENTED BY MODEL 4952,
AD-434 703 DIV. 31

LANGUAGE
ANALYSIS
A PREFACE TO COMPUTATIONAL STYLISTICS,
AD-433 513 DIV. 30

LANGUAGE
INTELLIGIBILITY
AMBIGUITY IN CONTEXT FREE LANGUAGES,
AD-433 838 DIV. 30A

LANGUAGE
SOCIAL COMMUNICATION
COMMUNICATIONS, SEMANTICS, AND INFORMATION SYSTEMS,
AD-434 029 DIV. 5

LANGUAGE
SOCIAL SCIENCE
SOME LANGUAGE ASPECTS OF THE U. S. ADVISORY ROLE IN SOUTH VIETNAM,
AD-434 056 DIV. 32

LANGUAGE
THEORY
U. S.-JAPAN SEMINAR ON MECHANICAL TRANSLATION SUMMARY OF U. S. CONTRIBUTIONS,
AD-433 850 DIV. 30

LANTHANUM COMPOUNDS
TELLURIDES
TELLURIDES OF LANTHANUM,
AD-434 972 DIV. 4

LASERS
COMMUNICATION SYSTEMS
APPLICABILITY OF LASER TECHNIQUES,
AD-434 378 DIV. 25

LASERS
GARNET
SOLID-STATE MASER RESEARCH (OPTICAL),
AD-433 775 DIV. 6

LASERS
GASES
GASEOUS OPTICAL MASERS,
AD-433 961 DIV. 25

LASERS
MATERIALS
SEMICONDUCTOR DEVICE CONCEPTS,
AD-433 975 DIV. 8

LASERS
NONLINEAR SYSTEMS
STATISTICAL FLUCTUATION IN NONLINEAR OPTICAL PROCESSES,
AD-434 890 DIV. 25

LASERS
PERFORMANCE (ENGINEERING)
CONTROL OF LASER PERFORMANCE,
AD-434 166 DIV. 25

LASERS
RANGE FINDING
FEASIBILITY OF A LUNAR OPTICAL RANGING EXPERIMENT,
AD-434 586 DIV. 25

LAUNCH VEHICLES (AEROSPACE)
OSCILLATION
DYNAMICS OF THE ATALS S-CP1 LONGITUDINAL OSCILLATION FOLLOWING LAUNCH AS RELATED TO THE TANK PRESSURE REGULATION SYSTEM, VOLUME II, PNEUMATIC SYSTEM MODEL DEVELOPMENT,
AD-435 037 DIV. 12

LAUNCH VEHICLES (AEROSPACE)
VIBRATION
DYNAMICS OF THE ATLAS S-CPS LONGITUDINAL OSCILLATION FOLLOWING LAUNCH AS RELATED TO THE TANK PRESSURE REGULATION SYSTEM, VOLUME II LONGITUDINAL MODEL DEVELOPMENT,
AD-435 036 DIV. 12

LEADERSHIP
GROUP DYNAMICS
PREDICTABILITY OF SMALL GROUP LEADERSHIP CRITERIA,
AD-434 864 DIV. 28
AN INVESTIGATION OF THE PRODUCT MOMENT INTERCORRELATIONS AMONG SMALL GROUP LEADERSHIP CRITERIA,
AD-434 865 DIV 28

LEAST SQUARES METHOD
THEORY
A METHOD FOR COMPUTING LEAST SQUARES ESTIMATORS THAT KEEP UP WITH THE DATA,
AD-434 715 DIV. 19

LENSES
OPTICAL PHENOMENA
WIDE ANGLE CONDENSERS,
AD-433 579 DIV. 30

LEUKOCYTES
RADIATION EFFECTS
LATEST EXPERIMENTAL DATA ON THE ETIOLOGY OF LEUKOSES,
AD-433 537 DIV. 16

LIGHT
MODULATION
RESEARCH ON TECHNIQUES FOR LIGHT MODULATION DETECTION,
AD-434 127 DIV. 25

LIGHT TRANSMISSION
ATMOSPHERE
RESEARCH ON ATMOSPHERIC OPTICAL RADIATION TRANS- MISSION,
AD-434 773 DIV. 25
COMPENSATION PHOTOMETER FOR ACCURATE MEASUREMENTS AND REGISTRATION OF TRANSPARENCY OF ATMOSPHERE,
AD-434 950 DIV. 25

LIGHTING EQUIPMENT
TOWED BODIES
SERVICE SUITABILITY EVALUATION OF GENERATOR DROUGUE LIGHTING KITS FOR THE D-704 AIR REFUELING STORE,
AD-434 025 DIV. 7

LIGHTNING
MAGNETIC FIELDS
MAGNETIC FIELD VARIATIONS IN VICINITY OF LIGHTN- ING DISCHARGES,
AD-434 772 DIV. 25

LINE SPECTRUM
PARAMAGNETIC RESONANCE
ERRORS IN THE EVALUATION OF MOMENTS OF A PARAMAGNETIC RESONANCE LINE SHAPE,
AD-433 560 DIV. 25

LINEAR PROGRAMMING
COSTS
ON THE ALGORITHMS OF SZWARC AND FEDEROWICZ FOR LINEAR PROGRAMMING PROBLEMS WITH BOOLEAN VARIABLES,
AD-435 039 DIV. 19

LINEAR PROGRAMMING
OPTIMIZATION
AN ALL-INTEGER INTEGER PROGRAMMING ALGORITHM,
AD-433 043 DIV. 30

LINEAR PROGRAMMING
PROJECTIVE GEOMETRY
NOTES ON OPERATIONS RESEARCH-2,
AD-434 782 DIV. 19

LINEAR PROGRAMMING
SCHEDULING
A STUDY OF THE ALL-INTEGER, INTEGER PROGRAMMING ALGORITHM,
AD-435 046 DIV. 30

LINEAR SYSTEMS
BIOLOGY
EXPERIMENTS WITH PATTERNS OF EVOLUTION,
AD-433 855 DIV. 16

LINEAR SYSTEMS
OPTIMIZATION
LINEAR CONTROL LAWS FOR SINGULAR LINEAR SYSTEMS,
AD-433 814 DIV. 19

LIPIDS
EXCRETION
THE EXCRETION OF LIPID AND LIPID SUBSTANCES IN HUMAN SWEAT,
AD-433 521 DIV. 16

LIPIDS
METABOLISM
SAFETY AND UTILITY OF I.V. FAT EMULSION FOR HUMAN INTRAVENOUS ADMINISTRATION,
AD-434 068 DIV. 16

LIQUEFIED GASES
OXYGEN
DIFFUSION OF SLOW NEUTRONS THROUGH LIQUID OXYGEN,
AD-434 953 DIV. 20

LIQUID LEVEL CONTROL
INSTRUMENTATION
EVALUATION TESTS OF FLOAT-ACTUATED ELECTRICAL LIQUID LEVEL INDICATING SYSTEM MANUFACTURED BY LIQUIDOMETER CORPORATION,
AD-433 957 DIV. 30

LIQUID METALS
PURIFICATION
OPTIMUM PURIFICATION TECHNIQUES FOR THE REMOVAL OF CONTAMINANTS FROM LIQUID LITHIUM AND RUBIDIUM,
AD-434 544 DIV. 30

LIQUID ROCKET OXIDIZERS
STORAGE
EVALUATION OF THE MECHANISM OF CORROSION IN CAPILLARIES, OXIDIZER DIFFUSION STUDIES,
AD-433 622 DIV. 10

LIQUID ROCKET PROPELLANTS
FILTERS (FLUID)
A COMPATIBILITY EVALUATION OF PLASTIC MEMBRANE FILTERS WITH LIQUID PROPELLANTS AND SOLVENTS,
AD-434 592 DIV. 10

LIQUID ROCKET PROPELLANTS
WEIGHT
DESIGN EVALUATION/QUALIFICATION TEST OF CRYOGENIC CALIBRATION WEIGHT SYSTEM, MEASURING AND RECORDING,
AD-433 376 DIV. IDEP

LIQUIDS
ATOMIZATION
METHODS OF DESCRIBING DROPLET-SIZE DISTRIBUTIONS FROM ATOMIZED SOLUTIONS,
AD-434 106 DIV. 18

LIQUIDS
MOLECULAR SRUCTURE
STRUCTURE OF LIQUIDS,
AD-434 304 DIV. 25

LIQUIDS
STABILITY
THE COMPRESSIBILITY EFFECT OF A GAS STREAM ON THE STABILITY OF AN ADJACENT LIQUID LAYER,
AD-434 717 DIV. 9

LITHIUM
ATOMIC ENERGY LEVELS
THE FINE STRUCTURE OF THE 2P TERMS OF THE LITHIUM ISOELECTRONIC SEQUENCE,
AD-434 565 DIV. 25

LITHIUM
LIQUID METALS
OPTIMUM PURIFICATION TECHNIQUES FOR THE REMOVAL OF CONTAMINANTS FROM LIQUID LITHIUM AND RUBIDIUM,
AD-434 544 DIV. 30

LOADING (MECHANICS)
DISTRIBUTION
SKEWED LOAD-STRENGTH DISTRIBUTION IN RELIABILITY,
AD-434 414 DIV. 19

LOGISTICS
MATHEMATICAL MODELS
ON A PROBLEM OF OPTIMUM PRIORITY CLASSIFICATION,
AD-434 807 DIV. 19

LOW TEMPERATURE BATTERIES
AMMONIA
SIXTH SYMPOSIUM ON AMMONIA BATTERIES AT UNIVERSITY OF CALIFORNIA, BERKELEY, CALIFORNIA, JANUARY 30-31, 1964,
AD-433 973 DIV. 7

LOW TEMPERATURE RESEARCH
BLOOD
DEVELOPMENT OF PROCEDURES FOR THE LOW-TEMPERATURE PRESERVATION OF BLOOD,
AD-433 663 DIV. 16

LOW TEMPERATURE RESEARCH
WIRE
MAGNETORESISTANCE EFFECT IN ADVANCE AND EVANOHM WIRES AT LOW TEMPERATURES IN FIELDS UP TO 50 KILOGAUSS,
AD-434 385 DIV. 25

LOW-TEMPERATURE BATTERIES
PERFORMANCE (ENGINEERING)
LOW TEMPERATURE OPERATION OF BATTERIES,
AD-433 871 DIV. 7

LOW-TEMPERATURE RESEARCH
PHYSIOLOGY
THE EFFECT OF ACUTE EXPOSURE TO 2 DEGREES C ON HOST RESISTANCE TO EHRLICH ASCITES TUMOR,
AD-434 080 DIV. 14

LUBRICANT ADDITIVES
SURFACE PROPERTIES
SURFACE CHEMISTRY OF SOME LUBRICANT ADDITIVES,
AD-434 204 DIV. 14

LUBRICANTS
ADSORPTION
A STUDY OF AUTOPHOBIC LIQUIDS ON PLATINUM BY THE CONTACT POTENTIAL METHOD,
AD-433 796 DIV. 4

LUBRICATION
LUBRICANT ADDITIVES
SURFACE CHEMISTRY OF SOME LUBRICANT ADDITIVES,
AD-434 204 DIV. 14

LUMINESCENCE
ABSTRACTS
DETECTION OF THE TRIPLET STATE BY FPR AND OTHER METHODS, COMPILATION OF ABSTRACTS BASED ON SOVIET OPEN LITERATURE,
AD-434 712 DIV. 25

LUMINESCENCE
INTENSITY
CHEMI-IONIZATION AND CHEMILUMINESCENCE IN THE RE-ACTION OF ATOMIC OXYGEN WITH C2H2, C2D2, AND C2H4,
AD-434 982 DIV. 4

LUMINESCENCE
PHOSPHORESCENT MATERIALS
THERMAL AND OPTICAL EXTERNAL QUENCHING OF PHOTOLUMINESCENCE KJ-TI,
AD-434 946 DIV. 25

MACHINE TOOLS
AUTOMATION
SELF-ADJUSTING SYSTEM OF PROGRAM CONTROL OF METAL-CUTTING MACHINES,
AD-434 961 DIV. 24

MACHINE TRANSLATION
CLASSIFICATION
CLASSIFIER, AN AUTOMATED COMPUTER-ORIENTED IN- FORMATION CLASSIFICATION SYSTEM,
AD-434 768 DIV. 30

MACHINE TRANSLATION
SYMPOSIA
U. S.-JAPAN SEMINAR ON MECHANICAL TRANSLATION SUMMARY OF U. S. CONTRIBUTIONS,
AD-433 850 DIV. 30

MAGNETIC AMPLIFIERS
RADIATION EFFECTS
PERFORMANCE OF RADIATION-RESISTANCE MAGNETIC AMPLIFIER CONTROLS UNDER FAST NEUTRON AND GAMMA IRRADIATION,
AD-435 095 DIV. 8

MAGNETIC FIELDS
GALAXIES
OBSERVATIONS OF THE OWENS VALLEY RADIO OBSERVA- TORY, 2, DIRECTION OF THE GALACTIC MAGNETIC FIELD IN THE VICINITY OF THE SUN,
AD-434 040 DIV. 2

MAGNETIC FIELDS
LIGHTNING
MAGNETIC FIELD VARIATIONS IN VICINITY OF LIGHTN- ING DISCHARGES,
AD-434 772 DIV. 25

MAGNETIC FIELDS
MATHEMATICAL ANALYSIS
HORIZONTAL MAGNETIC DIPOLE IN A CONDUCTING EARTH,
AD-434 775 DIV. 25

MAGNETIC MATERIALS
RADIATION DAMAGE
BARKHAUSEN EFFECT IN IRRADIATED PURE IRON AND NICKEL,
AD-433 849 DIV. 25

MAGNETIC MOMENTS
PROGRAMMING (COMPUTERS)
A FORTRAN III (IBM 7090) PROGRAM FOR THE CALCULA- TION OF THREE-SUBLATTICE MAGNETIZATIONS,
AD-434 924 DIV. 30

MAGNETIC TAPE
DIGITAL COMPUTERS
RESEARCH ON ULTRAHIGH-SPEED DIGITAL TECHNIQUES, PROJECT CROWNER PHASE I,
AD-433 510 DIV. 30

MAGNETOHYDRODYNAMICS
DEFLAGRATION
MAGNETOHYDRODYNAMIC THEORY OF DEFLAGRATION AND DETONATION,
AD-434 569 DIV. 25

MAGNETOHYDRODYNAMICS
ENERGY CONVERSION
INVESTIGATION OF NON-EQUILIBRIUM IONIZATION FOR MHD ENERGY CONVERSION,
AD-434 574 DIV. 25

MAGNETOHYDRODYNAMICS
EQUATIONS
A SOLUTION OF THE COMPLEX DIELECTRIC EQUATIONS FOR ROCKET EXHAUST MICROWAVE INTERFEROMETRY,
AD-433 724 DIV. 25

MAGNETOHYDRODYNAMICS
FLUID FLOW
APPROXIMATE CALCULATION OF THE DISTRIBUTION OF CURRENT DURING THE FLOW OF A CONDUCTING LIQUID THROUGH A CHANNEL IN A MAGNETIC FIELD,
AD-434 952 DIV. 9

MAGNETOHYDRODYNAMICS
GENERATORS
DETAILED THEORETICAL AND EXPERIMENTAL STUDY ON A LARGE MHD GENERATOR,
AD-434 055 DIV. 25

MAGNETOMETERS
DATA
MAGNETOMETER, PHOTOMETER, AND EARTH OBSERVATIONS AT KIRUNA,
AD-434 778 DIV. 2

MAGNETRONS
PRODUCTION
BL-223 A C-BAND MAGNETRON, PRODUCTION ENGINEER- ING MEASURES PROGRAM, SECTION I, VOLUME I, STEPS I AND II,
AD-434 443 DIV. 8

MAINTENANCE PERSONNEL
JOB ANALYSIS
THE BUOPERATIONS RESEARCH INC., SILVER SPRING, MD,
AD-434 859 DIV. 23

MANAGEMENT ENGINEERING
AIRPORTS
AIRPORTS AND HELIPORTS: PLANNING, MANAGEMENT AND OPERATIONS, SAFETY, SELECTED REFERENCES,
AD-434 913 DIV. 33

MANAGEMENT ENGINEERING
MATHEMATICAL MODELS
SEMI-MARKOVIAN CONTROL SYSTEMS,
AD-434 242 DIV. 15
TECHNICAL PROGRESS IN TWO-SECTOR MODELS,
AD-434 450 DIV. 24

MANAGEMENT ENGINEERING
PUBLIC OPINION
SOCIAL VALUE AND TECHNOLOGICAL DESIGN,
AD-433 512 DIV. 32

MANAGEMENT ENGINEERING
QUEUEING THEORY
ON A PROBLEM OF OPTIMUM PRIORITY CLASSIFICATION,
AD-434 807 DIV. 19

MANUFACTURING METHODS
MAGNETRONS
BL-223 A C-BAND MAGNETRON, PRODUCTION ENGINEER- ING MEASURES PROGRAM, SECTION I, VOLUME I, STEPS I AND II,
AD-434 443 DIV. 8

MANUFACTURING METHODS
STORAGE TUBES
PRODUCTION ENGINEERING MEASURE FOR TYPE FW-202 BARRIER GRID STORAGE TUBE,
AD-434 047 DIV. 8

MANUFACTURING METHODS
TANTALUM CAPACITORS
PRODUCTION ENGINEERING MEASURE FOR IMPROVED RELIABILITY OF SOLID TANTALUM ELECTROLYTIC CAPACITORS,
AD-434 322 DIV. 8

MANUFACTURING METHODS
TRANSISTORS
PRODUCTION ENGINEERING MEASURE, MECHANIZATION OF SEMICONDUCTOR DEVICES 2N559-2N1094,
AD-433 812 DIV. 8
PRODUCTION ENGINEERING MEASURES TO IMPROVE TRANSISTOR RELIABILITY,
AD-434 402 DIV. 8

MANUFACTURING METHODS
VARACTOR DIODES
VARACTOR DIODE INDUSTRIAL PREPAREDNESS MEASURES,
AD-434 573 DIV. 8
VARACTOR DIODE INDUSTRIAL PREPAREDNESS MEASURES,
AD-434 574 DIV. 8
VARACTOR DIODE INDUSTRIAL PREPAREDNESS MEASURES,
AD-434 611 DIV. 8

MARINE BIOLOGY
MICROORGANISMS
ACTIVITIES OF HYDROGENASE IN MARINE ENVIRONMENTS AND THE CORROSION OF IRON,
AD-433 549 DIV. 14

MARINE ENGINEERING
UNDERWATER SOUND
SUBMARINE SEA-CONNECTED PUMPING SYSTEM NOISE REDUCTION STUDY - PHASE I,
AD-434 701 DIV. 31

MASS SPECTRUM
ATMOSPHERE
NEGATIVE IONS IN AFTERGLOWS IN ATMOSPHERIC GASES,
AD-434 191 DIV. 2

MATCHED FILTERS
PULSE TRANSMITTERS
OPTIMUM PULSE SHAPES FOR TRANSMITTERS WHICH ARE BOTH PEAK POWER LIMITED AND AVERAGE POWER LIMITED,
AD-434 673 DIV. 5

MATERIALS
DEFORMATION
REPRESENTATION THEOREMS IN THE MECHANICS OF MATERIALS WITH MEMORY,
AD-434 704 DIV. 28

MATERIALS
DEGASIFICATION
THEORETICAL AND EXPERIMENTAL STUDY TO DETERMINE OUTGASSING CHARACTERISTCS OF VARIOUS MATERIALS,
AD-433 484 DIV. 14

MATHEMATICAL LOGIC
OPTIMIZATION
DYNAMIC PROGRAMMING TECHNIQUES,
AD-433 897 DIV. 30

MATHEMATICAL LOGIC
SWITCHING CIRCUITS
A FORMAL THEORY OF GENERALIZED MULTIPLE-OUTPUT BINARY COMBINATIONAL SWITCHING NETWORKS,
AD-434 734 DIV. 8

MATHEMATICAL MODELS
ATOMIZATION
METHODS OF DESCRIBING DROPLET-SIZE DISTRIBUTIONS FROM ATOMIZED SOLUTIONS,
AD-434 106 DIV. 18

MATHEMATICAL PREDICTION
OPTIMIZATION
EXTENSIONS TO THEORY OF TIME-SERIE ANALYSIS,
AD-434 355 DIV. 18

MATHEMATICAL PREDICTIONS
OPTIMIZATION
SIMPLIFIED PREDICTOR-CORRECTOR METHODS,
AD-433 914 DIV. 18

MATRIX ALGEBRA
ALGEBRAIC GEOMETRY
MATRICES SIMILAR ON A ZARISKI-OPEN SET,
AD-433 944 DIV. 18

MATRIX ALGEBRA
LEAST SQUARES METHOD
ON THE GENERALIZED INVERSE OF AN INCIDENCE MATRIX,
AD-433 626 DIV. 18

MATRIX ALGEBRA
METAMATHEMATICS
THEOREMS OF GERSGORIN TYPE,
AD-433 879 DIV. 18

MECHANICAL WAVES
RESEARCH PROGRAM ADMINISTRATION
ANALYSIS OF THE DYNAMICS OF ELASTIC SYSTEMS,
AD-434 417 DIV. 25

MECHANICS
FAILURE (MECHANICS)
AN ANALYSIS OF CREEP RUPTURE,
AD-434 718 DIV. 25

MEDICAL RESEARCH
BURNS
TREATMENT OF VESICANT AND THERMAL BURNS,
AD-434 985 DIV. 14

MEDICAL RESEARCH
STATISTICAL ANALYSIS
A GENERAL USE OF THE POISSON APPROXIMATION FOR BINOMIAL EVENTS, WITH APPLICATION TO BACTERIAL ENDOCARDITIS DATA,
AD-433 511 DIV. 18

MEDICAL SUPPLIES
MATERIALS
PERFORMANCE EVALUATION OF APPRENTICE MEDICAL MATERIEL SPECIALISTS,
AD-434 041 DIV. 28

MEMBRANES
FILTERS (FLUID)
A COMPATIBILITY EVALUATION OF PLASTIC MEMBRANE FILTERS WITH LIQUID PROPELLANTS AND SOLVENTS,
AD-434 592 DIV. 10

MEMBRANES
ION EXCHANGE
STUDY OF THE GENERAL PROPERTIES OF SOME MINERAL ION EXCHANGE MEMBRANES AS WELL AS THEIR POSSIBLE USE IN LOW TEMPERATURE FUEL CELLS,
AD-433 803 DIV. 7

MEMBRANES (BIOLOGY)
ELECTRIC POTENTIAL
PERIODIC BEHAVIOR IN CHARGED MEMBRANES AND ITS PHYSICAL AND BIOLOGIAL IMPLICATIONS.
AD-434 307 DIV. 16

MEMBRANES (BIOLOGY)
TRANSPORT PROPERTIES
IONIC RELATIONSHIPS OF THE BIOELECTROGENIC MECHANISM IN ISOLATED RAT STOMACH,
AD-433 804 DIV. 16

METAL COATINGS
OXIDATION
STUDY OF DUCTILE COATINGS FOR THE OXIDATION PRO- TECTION OF COLUMBIUM AND MOLYBDENUM ALLOYS.
AD-434 441 DIV. 17

METAL COATINGS
ZINC
EVALUATION OF NATIONAL RESEARCH CORPORATION GLASS. MONOFILAMENTS.
AD-433 555 DIV. 14

METAL FILMS
DATA PROCESSING SYSTEMS
RESEARCH ON ULTRAHIGH-SPEED DIGITAL TECHINIQUES, PROJECT CROWNER PHASE I.
AD-433 510 DIV. 30

METAL FILMS
EPITAXIAL GROWTH
THE STRUCTURE AND STRENGTH OF EPITAXIAL FILMS.
AD-434 805 DIV. 25

METALLIC CRYSTALS
DIFFUSION
AN INVESTIGATION OF INTERDIFFUSION IN METALLIC SINGLE CRYSTALS.
AD-433 509 DIV. 25

METALS
DEFORMATION
DEFORMATION OF METAL IN AN ULTRASONIC FIELD,
AD-434 978 DIV. 17

METALS
FRACTURE (MECHANICS)
FRACTURE OF METALS.
AD-435 021 DIV. 17

METALS
HEAT TRANSFER
INTERMITTENT HEAT CONDUCTION INTO A METAL SLAB, PART I, ANALYSIS. PART II, NUMERICAL CALCULATION,
AD-434 052 DIV. 25

METALS
RADIATION DAMAGE
EFFECT OF HIGH THERMAL RADIATION FLUX ON SEVERAL METAL ALLOYS.
AD-434 448 DIV. 17

METAMATHEMATICS
FUNCTIONS
ON THE THEORY OF BOOLEAN FORMULAS: MINIMAL INCLUDING SUMS, I.
AD-433 595 DIV. 18
ON THE THEORY OF BOOLEAN FORMULAS: MINIMAL INCLUDING SUMS, II.
AD-433 599 DIV. 18

METAMATHEMATICS
PROGRAMMING (COMPUTERS)
A PLATO PROGRAM FOR INSTRUCTION AND DATA COLLECTION IN MATHEMATICAL PROBLEM SOLVING,
AD-434 249 DIV. 30

METEORITES
DETECTION
DESIGN, DEVELOPMENT, AND CONSTRUCTION OF MICRO- METEORITE DETECTION SYSTEMS.
AD-434 784 DIV. 6

METEORITES
IMPACT SHOCK
MOVEMENT OF A GAS UNDER THE ACTION OF A CONCENTRATED IMPACT ON ITS SURFACE (DURING AN EXPLOSION ON THE SURFACE),
AD-434 954 DIV. 2

METEOROLOGICAL BALLOONS
RADAR TRACKING
ACCURACY OF METEOROLOGICAL DATA OBTAINED BY TRACKING THE ROBIN WITH MPS-19 RADAR;
AD-434 379 DIV. 2

METEOROLOGICAL INSTRUMENTS
DESIGN
AN INVESTIGATION OF ATMOSPHERIC TURBULENT TRANSFER PROCESSES OVER WATER: INSTRUMENTATION,
AD-433 832 DIV. 2

METEOROLOGICAL RADAR
WEATHER STATIONS
WEATHER RADAR TECHNIQUE DEVELOPMEN
AD-433 912 DIV. 2

METEOROLOGICAL SATELLITES
DATA PROCESSING SYSTEMS
WEATHER SATELLITE DATA PROCESSING,
AD-433 731 DIV. 2

METEOROLOGY
BIBLIOGRAPHIES
A HISTORICAL SURVEY OF STATISTICAL WEATHER PREDICTION,
AD-433 743 DIV. 2

METEOROLOGY
SIMULATION
A STUDY TO IMPROVE THE LOW-LEVEL METEOROLOGICAL SIMULATOR,
AD-433 777 DIV. 2

MICROMINIATURIZATION (ELECTRONICS)
CIRCUITS
DEVELOPMENT OF FUNCTIONAL DESCRIPTIONS FOR SIX PREFERRED MICROELECTRONIC ASSEMBLIES.
AD-434 658 DIV. 8

MICROMINIATURIZATION (ELECTRONICS)
MANUFACTURING METHODS
LOW-COST MICROCIRCUITS FOR MICROASSEMBLIES.
AD-433 891 DIV. 8
LOW-COST MICROCIRCUITS FOR MICRO-ASSEMBLIES.
AD-433 891 DIV. 8

MICROMINIATURIZATION (ELECTRONICS)
NAVAL EQUIPMENT
INFORMATION ON MICROELECTRONICS FOR NAVY AVIONICS EQUIPMENT,
AD-434 109 DIV. 8

MICROMINIATURIZATION (ELECTRONICS)
SWITCHING CIRCUITS
FUNCTIONAL CIRCUIT UNITS.
AD-433 711 DIV. 8

MICROPHONES
CALIBRATION
DEVICE FOR THE CALIBRATION OF MEASURING MICROPHONES,
AD-433 605 DIV. 8

MICROSCOPES
DESIGN
THE UNIVERSAL MEASURING MICROSCOPE UIM-23.
AD-433 582 DIV. 30

MICROWAVE AMPLIFIERS
KLYSTRONS
HIGH POWER X-BAND GENERATOR,
AD-433 704 DIV. 8

MICROWAVE AMPLIFIERS
PLASMA PHYSICS
MILLIMETER WAVE COMPONENT DEVELOPMENT (BEAMPLASMA AMPLIFIER),
AD-433 900 DIV. 8

MICROWAVE COMMUNICATION SYSTEMS
SITE SELECTION
CURRENT PRACTICES U.S.S.R. MICROWAVE SITE AND PATH ENGINEERING FOR MAJOR, LONG HAUL, COMMON CARRIER SYSTEMS,
AD-434 263 DIV. 8

MICROWAVE FREQUENCY
SCIENTIFIC RESEARCH
RESEARCH IN THE FIELD OF MICROWAVE FREQUENCY
AD-434 708 DIV. 30

MICROWAVE SPECTROSCOPY
HYPOCHLORITES
THE MICROWAVE SPECTRUM OF METHYL HYPOCHLORITE,
AD-434 343 DIV. 25

MICROWAVES
IONOSPHERIC PROPAGATION
IONOSPHERIC TRANSMISSION OF TRANSVERSELY PROPA- GATED PLANE WAVES AT MICROPULSATION FREQUENCIES AND THEORETICAL POWER SPECTRUMS,
AD-433 479 DIV. 25

MICROWAVES
SOLID STATE PHYSICS
SOLID-STATE MICROWAVE RESEARCH.
AD-434 146 DIV. 8

MICROWAVES
TABLES
ON THE LINEAR POLARIZATION OF THE RADIATION FROM RADIO SOURCES.
AD-433 094 DIV. 8

MILITARY FACILITIES
ARMED FORCES (FOREIGN)
INDIVIDUAL CLOTHING AND EQUIPMENT FOR INDIGENOUS FORCES IN SOUTHEAST ASIA,
AD-433 874 DIV. 29

MILITARY PSYCHOLOGY
AVIATION PERSONNEL
PERSONALITY ORIENTATION AND SUCCESS IN NAVAL AVIATION TRAINING,
AD-434 922 DIV. 23

MILITARY PUBLICATION
USSR
FUTURE TRENDS IN SOVIET SCIENCE AND TECHNOLOGY. REVIEW OF SOVIET LITERATURE,
AD-435 019 DIV. 32

MILITARY RATIONS
ACCEPTABILITY
A COMPARISON APPROACH TO FOOD ACCEPTANCE,
AD-434 672 DIV. 29

MILITARY REQUIREMENTS
COMMUNICATION SYSTEMS
METHODS FOR DETERMINING OPTIMAL TRAFFIC ROUTES IN LARGE COMMUNICATION NETWORKS,
AD-434 856 DIV. 5

MILLIMETER WAVES
DETECTION
EXCITATION AND DETECTION TECHNIQUES FOR MILLIMETER WAVE TRANSITIONS,
AD-434 001 DIV. 28

MILLIMETER WAVES
MIXERS (ELECTRONIC)
DIODE, MILLIMETER WAVE TYPE MIXER (3.2 MM),
AD-433 797 DIV. 8

MILLIMETER WAVES
PARAMETRIC AMPLIFIERS
DEVELOPMENT OF A LOW-NOISE MILLIMETER-WAVE PARA- METRIC AMPLIFIER,
AD-434 062 DIV. 8

MIXERS (ELECTRONIC)
DIODES (SEMICONDUCTORS
DIODE, MILLIMETER WAVE TYPE MIXER (3.2 MM),
AD-433 797 DIV. 8

MODEL TESTS
MODEL BASINS
CAVITATION PERFORMANCE OF PROPELLERS IN A SUBMARINE WAKE,
AD-434 185 DIV. 31

MODULATORS
DESIGN
SHORT-PULSE MODULATOR,
AD-433 702 DIV. 8
A DELTA-SIGMA MODULATION SYSTEM FOR TIME DELAY AND ANALOG FUNCTION STORAGE,
AD-434 539 DIV. 30

MOLECULAR STRUCTURE
LIQUIDS
STRUCTURE OF LIQUIDS,
AD-434 304 DIV. 25

MOLYBDENUM
MECHANICAL PROPERTIES
MECHANICAL PROPERTIES AND TEMPERATURE OF RECRYSTALLIZATION OF SINGLE CRYSTALS OF MOLYBDENUM,
AD-434 969 DIV. 17

MOLYBDENUM
PERMEABILITY
PERMEATION OF HYDROGEN THROUGH METALS IN THER- MIONIC-CONVERTER APPLICATIONS,
AD-434 873 DIV. 7

MOLYBDENUM ALLOYS
PROTECTIVE TREATMENTS
STUDY OF DUCTILE COATINGS FOR THE OXIDATION PRO- TECTION OF COLUMBIUM AND MOLYBDENUM ALLOYS,
AD-434 441 DIV. 17

MOLYBDENUM ALLOYS
STRAIN (MECHANICS)
THE USE OF STRAIN SOFTENING TO IMPROVE THE PROPERTIES OF REFRACTORY METALS.
AD-434 207 DIV. 17

MONEY
ECONOMICS
EFFECTS OF INFLATION ON THE COMPOSITION OF THE MONEY SUPPLY,
AD-433 851 DIV. 32

MONOMOLECULAR FILMS
ADSORPTION
A STUDY OF AUTOPHOBIC LIQUIDS ON PLATINUM BY THE CONTACT POTENTIAL METHOD,
AD-433 796 DIV. 4

MONTE CARLO METHOD
DISTORTION
SOME EXAMPLES OF STOCHASTIC DISTORTION, A MONTE CARLO TECHNIQUE,
AD-434 020 DIV. 19

MORPHINE
LABORATORY ANIMALS
EFFECT OF COLD EXPOSURE ON THE ACTION OF MORPHINE IN RATS AND MICE,
AD-434 079 DIV. 16

MUSIC
PERFORMANCE (HUMAN)
VIGILANCE WITH BACKGROUND MUSIC,
AD-433 624 DIV. 28

NAVAL AIRCRAFT
DISPLAY SYSTEMS
DISPLAY FIELD ENLARGEMENT THROUGH PERIPHERAL PRESENTATION OF EXTRA-FIELD ERROR,
AD-433 733 DIV. 6

NAVAL EQUIPMENT
MALFUNCTIONS
STARSHINE PROGRAM FOR STORAGE, RETRIEVAL, AND ANALYSIS OF SHOCK-DAMAGE INFORMATION,
AD-433 795 DIV. 31
THE BUOPERATIONS RESEARCH INC., SILVER SPRING, MD.
AD-434 859 DIV. 23

NAVAL TRAINING
COMMUNICATION THEORY
TRAINING ANALYSIS PROCEDURE (TAP), VOLUME II THEORETICAL DEVELOPMENT,
AD-434 816 DIV. 23

NAVAL TRAINING
NAVAL AVIATION
PERSONALITY ORIENTATION AND SUCCESS IN NAVAL AVIATION TRAINING,
AD-434 922 DIV. 23

NAVAL TRAINING
THEORY
TRAINING ANALYSIS PROCEDURE (TAP), VOLUME II THEORETICAL DEVELOPMENT,
AD-434 816 DIV. 23

NAVIGATIONAL AIDS
SPACEBORNE
DOPPLER OPTICAL NAVIGATOR,
AD-434 227 DIV. 19

NEOPLASMS
RADIATION EFFECTS
CARCINOGENESIS BY FAST NEUTRONS RELATIVE TO X RAYS IN MICE: EFFECT OF UNINEPHRECTOMY AND OF CCL4,
AD-433 886 DIV. 16

NERVOUS SYSTEM
INSECTICIDES
CENTRAL NERVOUS SYSTEM EFFECTS OF CHRONIC EX- POSURE TO ORGANOPHOSPHATE INSECTICIDES,
AD-434 090 DIV. 16

NETWORKS
DESIGN
THE USE OF ADAPTIVE CONSTRAINED DESCENT IN SYSTEMS DESIGN,
AD-433 721 DIV. 30

NETWORKS
DETERMINANTS
GENERAL TOPOLOGICAL ANALYSIS OF LINEAR SYSTEMS,
AD-433 495 DIV. 18

NETWORKS
MATHEMATICAL MODELS
A MATHEMATICAL MODEL OF A TWO-LAYER NETWORK OF THRESHOLD ELEMENTS,
AD-434 767 DIV. 30

NETWORKS
MILITARY REQUIREMENTS
METHODS FOR DETERMINING OPTIMAL TRAFFIC ROUTES IN LARGE COMMUNICATION NETWORKS,
AD-434 856 DIV. 5

NEUTRON BEAMS
DIFFRACTION
A SUBTHERMAL NEUTRON BEAM COLLIMATED BY TOTAL REFLECTION,
AD-433 615 DIV. 20

NEUTRON FLUX
DENSITY
INVESTIGATION OF THE INCREMENT OF NEUTRON FLUX DENSITY OBTAINED IN THE BREEDING ZONES BY THE ADDITION OF EXTRA REFLECTORS MADE OF VARIOUS SUBSTANCES,
AD-433 527 DIV. 28

NEUTRONS
ALBEDO
DEPENDENCE OF NEUTRON ALBEDOS UPON HYDROGEN CONTENT OF A SHIELD,
AD-433 735 DIV. 20

NEUTRONS
DIFFUSION
DIFFUSION OF SLOW NEUTRONS THROUGH LIQUID OXYGEN,
AD-434 953 DIV. 20

NICKEL
MAGNETIC PROPERTIES
BARKHAUSEN EFFECT IN IRRADIATED PURE IRON AND NICKEL,
AD-433 849 DIV. 25

NICKEL
PERMEABILITY
PERMEATION OF HYDROGEN THROUGH METALS IN THER- MIONIC-CONVERTER APPLICATIONS,
AD-434 873 DIV. 7

NICKEL ALLOYS
RUPTURE
TIME-TEMPERATURE PARAMETER FOR RUPTURE STRESSES IN NIMONIC 80A AND MONEL, USING MECHANICAL CHEMICAL EQUATIONS OF STATE,
AD-434 064 DIV. 17

NIOBIUM
CREEP
GENERAL RESEARCH, CREEP OF NIOBIUM AT LOW TEMPERATURES,
AD-433 492 DIV. 17

NIOBIUM
DEFORMATION
THE EFFECT OF STRESS ON THE LUDERS BAND VELOCITY IN NIOBIUM,
AD-434 098 DIV. 17

NIOBIUM ALLOYS
PROTECTIVE TREATMENTS
STUDY OF DUCTILE COATINGS FOR THE OXIDATION PRO- TECTION OF COLUMBIUM AND MOLYBDENUM ALLOYS,
AD-434 441 DIV. 17

NITRATES
CHROMYL RADICALS
TEMPERATURE STABILITY LIMITS AND DIFFERENTIAL THERMAL ANALYSIS OF CHROMYL NITRATE, SYNTHESIS OF TITANIUM IV COMPOUNDS CONTAINING NITRATE GROUPS,
AD-434 262 DIV. 4

NITROGEN
SOLUBILITY
DETERMINATION OF THE SOLUBILITY OF NITROGEN IN WATER AND EXTRACTED HUMAN FAT,
AD-434 426 DIV. 16

NITROGEN
TRANSPORT PROPERTIES
TRANSPORT PROPERTIES OF NITROGEN, HYDROGEN, OXY- GEN, AND AIR TO 30,000 K,
AD-433 053 DIV. 2

NITROGEN COMPOUNDS
RECOMBINATION REACTIONS
FURTHER STUDIES OF IODINE ATOM RECOMBINATION,
AD-434 714 DIV. 4

NOISE
ANALYSIS
COMPARISON OF THEORETICAL AND EXPERIMENTAL VALUES OF SPATIAL CORRELATION,
AD-433 749 DIV. 25

NOISE
EXPOSURE METERS
EXPERIMENTAL INVESTIGATION OF A PROTOTYPE NOISE EXPOSURE METER,
AD-434 404 DIV. 25

NOISE GENERATORS
DESIGN
A HYBRID ANALOG-DIGITAL PSEUDO-RANDOM NOISE GENERATOR,
AD-434 556 DIV. 30

NOISE (RADIO)
RADIO SIGNALS
A STUDY OF ''PROPAGATION MEDIUM RF NOISE''
AD-433 630 DIV. 8

NON-DESTRUCTIVE TESTING
GUIDED MISSILE COMPONENTS
NONDESTRUCTIVE SYSTEM FOR INSPECTION OF FIBER GLASS REINFORCED PLASTIC MISSILE CASES AND OTHER STRUCTURAL MATERIALS,
AD-434 819 DIV. 8

NON-DESTRUCTIVE TESTING
HALL EFFECT
INVESTIGATION OF HALL-EFFECT DEVICES FOR FLAW DETECTION IN METALS,
AD-433 895 DIV. 30

NON-DESTRUCTIVE TESTING
SYMPOSIA
PROCEEDINGS OF THE SYMPOSIUM ON NONDESTRUCTIVE TESTING OF WOOD,
AD-434 815 DIV. 14

NOZZLE GAS FLOW
FLIGHT CONTROL SYSTEMS
SUPERSONIC EXPIRATION OF GAS OUT OF ASYMMETRIC VESSEL OF FINITE WIDTH DURING MAXIMUM EXPENDITURE,
AD-434 947 DIV. 27

NUCLEAR ENGINEERING
REPORTS
NRL QUARTERLY ON NUCLEAR SCIENCE AND TECHNOLOGY,
AD-434 279 DIV. 20

NUCLEAR EXPLOSIONS
UNDERGROUND EXPLOSIONS
PROJECT SHOAL VOLUNTEER TEAM PROGRAM,
AD-434 785 DIV. 20

NUCLEAR PHYSICS
DATA PROCESSING SYSTEMS
PRINTING AND CONTROL UNIT FOR USE IN NUCLEAR MEASUREMENTS,
AD-434 724 DIV. 20A

NUCLEAR POWER PLANTS
DIODES
KRYPTON FILLED THERMIONIC COVERTER,
AD-434 087 DIV. 7

NUCLEAR REACTIONS
STRIPPED ATOM
COULOMB WAVE AMPLITUDES FOR L=0 STRIPPING REACTIONS,
AD-434 467 DIV. 25

NUCLEAR REACTORS
CONTAINMENT
THE PLASTIC RESPONSE TO INTERNAL BLAST LOADING OF MODELS OF OUTER CONTAINMENT STRUCTURES FOR NUCLEAR REACTORS,
AD-433 618 DIV. 20

NUCLEAR REACTORS
HISTORY
THE FIRST SOVIET NUCLEAR REACTOR,
AD-434 446 DIV. 20

NUCLEAR RESONANCE
HYDROGEN
NUCLEAR RESONANCE RESEARCH,
AD-434 277 DIV. 20

NUCLEAR WEAPONS
AIRCRAFT FIRES
AN ANALYSIS OF THE TEMPERATURE-TIME DATA OBTAINED FROM A STEEL CYLINDER ENGULFED BY AN AIRCRAFT- FUEL FIRE,
AD-434 800 DIV. 1

NUCLEAR-POWERED VESSELS
CONTROLLED ATMOSPHERES
SUBMARINE ATMOSPHERE STUDIES ABOARD USS SCULPIN,
AD-433 896 DIV. 31

NUMBERS
SEQUENCES
ON CALCULATION OF THE BETTI NUMBERS OF A DIFFERENTIABLE MANIFOLD WHICH IS KNOWN ONLY BY ONE OF ITS ATLASSES,
AD-434 577 DIV. 15

NUMERICAL METHODS AND PROCEDURES
SPECIAL FUNCTIONS (MATHEMATICAL)
NUMERICAL PROCEDURES FOR INTERPOLATION BY SPLINE FUNCTIONS,
AD-434 985 DIV. 15

OCEAN WAVES
AMPHIBIOUS VEHICLES
MOTIONS OF TILT FLOAT VEHICLES IN WAVES,
AD-434 163 DIV. 11

OCEANOGRAPHIC DATA
GRAVITY
AUTOMATIC GRAVITY SYSTEM USED ABOARD R/V CHAIN JULY 1962 - SEPTEMBER 1963. SUPPLEMENTARY REPORT,
AD-434 673 DIV. 2

OCEANS
SURFACES
COMPARISON OF THEORETICAL AND EXPERIMENTAL VALUES OF SPATIAL CORRELATION,
AD-433 749 DIV. 28

OPERATIONS RESEARCH
INDUSTRIAL PROCUREMENT
SOME ORDER STATISTICS RELATING TO MARKOV CHAINS: AN APPLICATION TO PURCHASING POLICIES,
AD-433 690 DIV. 26

OPERATIONS RESEARCH
OPTIMIZATION
DECENTRALIZED MANAGEMENT OF INTERACTING PROCESSES: A TECHNIQUE OF NONLINEAR PROGRAMMING (II),
AD-433 688 DIV. 30
DECENTRALIZED MANAGEMENT OF INTERACTING PROCESSES: A TECHNIQUE OF NONLINEAR PROGRAMMING,
AD-433 689 DIV. 30

OPERATIONS RESEARCH
PROGRAMMING (COMPUTERS)
DYNAMIC PROGRAMMING TECHNIQUES,
AD-433 897 DIV. 30

OPERATOR (PERSONNEL)
PERFORMANCE TESTS
SIGNAL DETECTION BY HUMAN OBSERVERS,
AD-434 825 DIV. 23

OPERATORS (MATHEMATICS)
LINEAR SYSTEMS
SOME USEFUL NOTIONS IN LINEAR VECTOR SPACES,
AD-434 564 DIV. 19

OPTICAL EQUIPMENT
MICROSCOPES
THE UNIVERSAL MEASURING MICROSCOPE UIM-23,
AD-433 582 DIV. 30

OPTICAL EQUIPMENT
PHOTOGRAPHIC RECORDING MEDIA
MATRIX CONTROLLED DISPLAY DEVICE,
AD-433 502 DIV. 24

OPTICAL EQUIPMENT COMPONENTS
LENSES
WIDE ANGLE CONDENSERS,
AD-433 579 DIV. 36

OPTICAL PHENOMENA
STATISTICAL ANALYSIS
STATISTICAL FLUCTUATION IN NONLINEAR OPTICAL PROCESSES,
AD-434 890 DIV. 28

OPTICAL TRACKING
PERFORMANCE STUDIES ON THE NOTS-UCLA TRACKING SIMULATOR WITH TWO OPTICAL SYSTEMS AND A SWITCH- ING OPTION,
AD-435 001 DIV. 6

OPTICS
REFLECTION
CREATORS OF ANTI-REFLECTION COATED OPTICS,
AD-433 532 DIV. 7

OPTIMIZATION
CALCULUS OF VARIATIONS
A COMPARISON BETWEEN SOME METHODS FOR COMPUTING OPTIMUM PATHS IN THE PROBLEM OF BOLZA,
AD-434 225 DIV. 19

ORBITAL TRAJECTORIES
CELESTIAL MECHANICS
A BRIEF SURVEY OF SATELLITE ORBIT COMPUTATION METHODS AND MAJOR PERTURBATIVE EFFECTS,
AD-434 348 DIV. 12

OSCILLATION
DAMPING
EFFECT OF SPEED AND WAVE HEIGHT ON THE ROLLING OF A SHIP MODEL WITH PASSIVE ANTI-ROLLING TANKS,
AD-433 738 DIV. 9

OSCILLATION
NONLINEAR SYSTEMS
NONLINEAR OSCILLATIONS IN A SECOND ORDER SYSTEM,
AD-433 472 DIV. 19

OSCILLATORS
CONTROL SYSTEMS
A LOCK-ON PROBABILITY ANALYSIS FOR THE INITIAL SYNCHRONIZATION OF PHASE-LOCKED LOOPS,
AD-433 698 DIV. 8

OSCILLATORS
L BAND
AN L-BAND TUNNEL DIODE OSCILLATOR,
AD-434 553 DIV. 8

OSCILLATORS
NAVIGATION
ATOMIC OSCILLATOR DEVICE FOR NAVIGATION GUIDANCE,
AD-434 078 DIV. 19

OSCILLATORS
NONLINEAR SYSTEMS
THE CONSTRUCTION OF PERIODIC SOLUTIONS OF NONLINEAR OSCILLATORS,
AD-434 453 DIV. 19

OXIDATION
AROMATIC COMPOUNDS
OXIDATION OF AROMATIC COMPOUNDS BY ELECTRON TRANSFER,
AD-434 557 DIV. 4

OXIDES
CERAMIC MATERIALS
ALUMINUM OXIDE. DATA SHEETS,
AD-434 173 DIV. 14

OXIDES
SEMICONDUCTORS
INVESTIGATION OF THE SURFACE OPTICAL PROPERTIES OF OXIDES AS A FUNCTION OF COMPOSITION,
AD-434 372 DIV. 25

OXYCHLORIDES
HYDROLYSIS
AQUEOUS BEHAVIOR OF ALUMINUM OXYCHLORIDE,
AD-434 442 DIV. 4

OXYGEN
CHEMICAL REACTIONS
CHEMI-IONIZATION AND CHEMILUMINES- CENCE IN THE RE-ACTION OF ATOMIC OXYGEN WITH C2H2, C2D2, AND C2H4,
AD-434 982 DIV. 4

OXYGEN
LIQUEFIED GASES
DIFFUSION OF SLOW NEUTRONS THROUGH LIQUID OXYGEN,
AD-434 953 DIV. 20

OXYGEN
TRANSPORT PROPERTIES
TRANSPORT PROPERTIES OF NITROGEN, HYDROGEN, OXY- GEN, AND AIR TO 30,000 K,
AD-435 053 DIV. 2

PAINTS
RUNWAYS
INITIAL FIELD TESTING OF AIRFIELD MARKING PAINTS,
AD-434 891 DIV. 13

PANELS (STRUCTURAL)
LOADING (MECHANICS)
LARGE AMPLITUDE VIBRATION AND RESPONSE OF CURVED PANELS,
AD-433 885 DIV. 12

PANELS (STRUCTURAL)
SHEAR STRESSES
BENDING OF AN ELLIPTIC PLATE UNDER A MOMENT AT THE CENTER,
AD-433 477 DIV. 19

PARABOLIC ANTENNAS
SPACE COMMUNICATION SYSTEMS
RESEARCH AND EXPERIMENTATION ON SPACE APPLICATIONS OF MILLIMETER WAVES,
AD-434 543 DIV. 8

PARAMAGNETIC RESONANCE
ABSORPTION SPECTRUM
INVESTIGATION OF NARROW LINE PARAMAGNETIC RESONANCE ABSORPTION SPECTRUM IN SINGLE CRYSTAL CALCITE,
AD-433 680 DIV. 25

PARAMAGNETIC RESONANCE
LINE SPECTRUM
ERRORS IN THE EVALUATION OF MOMENTS OF A PARAMAGNETIC RESONANCE LINE SHAPE,
AD-433 560 DIV. 25

PARAMETRIC AMPLIFIERS
METAL FILMS
FOUNDATIONAL RESEARCH PROJECTS OCTOBER-DECEMBER 1963,
AD-433 998 DIV. 8

PARAMETRIC AMPLIFIERS
MILLIMETER WAVES
DEVELOPMENT OF A LOW-NOISE MILLIMETER-WAVE PARA- METRIC AMPLIFIER,
AD-434 062 DIV. 8

PARAWINGS
REENTRY VEHICLES
PROJECT FIRST,
AD-434 396 DIV. 12

PARTIAL DIFFERENTIAL EQUATIONS
INCOMPRESSIBLE FLOW
EXAMINATION OF THE SOLUTIONS OF TH NAVIER-STOKES EQUATIONS FOR A CLASS OF THREE DIMENSIONAL VORTICES, PART III: TEMPERATURE DISTRIBUTIONS FOR STEADY MOTION,
AD-433 736 DIV. 9

PARTICLES
AEROSOLS
IN REFERENCE TO THE THEORY OF ELECTRICAL COAGULATION OF SPHERICAL AEROSOL PARTICLES,
AD-434 958 DIV. 25

PARTICLES
ATMOSPHERE
CALCULATION OF THE SPATIAL DIFFUSION OF SMALL PARTICLES IN AN EXPONENTIAL ATMOSPHERE,
AD-435 051 DIV. 2

PARTICLES
DIFFUSION
THE FLUORESCENT PARTICLE ATMOSPHERIC TRACER,
AD-434 169 DIV. 3

PASTEURELLA
ABSTRACTS
SELECTED ABSTRACTS FROM SOVIET BIOMEDICAL JOURNALS. NO. 3, SERIES 2,
AD-434 278 DIV. 14

PASTEURELLA
DISEASES
DIFFERENTIAL MOLYBDENUM MEDIUM FOR PLAGUE AND PSEUDOTUBERCULOSIS BACTERIA,
AD-434 920 DIV. 16
THE FATE OF PLAGUE BACTERIOPHAGE IN THE ORGANISM OF HEALTHY AND PLAGUE INFECTED GREAT GERBILS AND THE POSSIBLE ROUTES OF ITS TRANSMISSION IN EXPERIMENTAL CONDITIONS,
AD-434 921 DIV. 16

PATTERN RECOGNITION
ARTIFICIAL INTELLIGENCE
A MATHEMATICAL MODEL OF A TWO-LAYER NETWORK OF THRESHOLD ELEMENTS,
AD-434 767 DIV. 30

PERFORMANCE TESTS
DETECTION
SIGNAL DETECTION BY HUMAN OBSERVERS,
AD-434 825 DIV. 23

PERFORMANCE (ENGINEERING)
CONCRETE
HIGH-COMPRESSIVE-STRENGTH CONCRETE, DEVELOPMENT OF CONCRETE MIXTURES,
AD-433 651 DIV. 19

PERFORMANCE (ENGINEERING)
ELECTRIC WIRE
2000 F POWER WIRE FOR AEROSPACE ENVIRONMENT,
AD-434 587 DIV. 7

PERFORMANCE (ENGINEERING)
OPTIMIZATION
THE USE OF ADAPTIVE CONSTRAINED DESCENT IN SYSTEMS DESIGN,
AD-433 721 DIV. 30

PERFORMANCE (ENGINEERING)
SIGNAL-TO-NOISE RATIO
OPTIMUM NOISE PERFORMANCE OF MULTITERMINAL AMPLIFIERS,
AD-434 781 DIV. 8

PERSONNEL
PERFORMANCE TESTS
GROUND ELECTRONICS SYSTEM FOR WS-133B (MINUTE- MAN) PERSONNEL SUBSYSTEM TEST AND EVALUATION PLAN,
AD-434 231 DIV. 28
THE CAPRI SYSTEM FOR NAVAL MANPOWER PLANNING AND CONTROL. VOLUME II. COMPUTER PROGRAM SPECIFICATIONS,
AD-434 572 DIV. 23

PERSONNEL
SAFETY
PROBABILITY OF PREVENTION OF EXPLOSIVE PROPAGATION AND PERSONNEL INJURY BY PROTECTIVE WALLS,
AD-433 953 DIV. 22

PERSPIRATION
LIPIDS
THE EXCRETION OF LIPID AND LIPID SUBSTANCES IN HUMAN SWEAT,
AD-433 521 DIV. 16

PHASE SHIFTERS
S BAND
DEVELOPMENT OF A FERRITE MATERIAL FOR A HIGH- POWER PHASE SHIFTER AT S-BAND,
AD-433 657 DIV. 8

PHASE SHIFTERS
SEMICONDUCTOR DEVICES
HIGH POWER SEMICONDUCTOR PHASE SHIFTING DEVICES,
AD-434 747 DIV. 8

PHASE-LOCKED COMMUNICATION SYSTEMS
SYNCHRONIZATION (ELECTRONICS)
A LOCK-ON PROBABILITY ANALYSIS FOR THE INITIAL SYNCHRONIZATION OF PHASE-LOCKED LOOPS,
AD-433 698 DIV. 8

PHENOLIC PLASTICS
SYNTHESIS (CHEMISTRY)
SYNTHESIS OF POLYMERIC POLYDIOXYARYLENEPHOSPHONITRYLATES,
AD-433 578 DIV. 4

PHOSPHATES
ELECTROLYTES
STUDY OF THE GENERAL PROPERTIES OF SOME MINERAL ION EXCHANGE MEMBRANES AS WELL AS THEIR POSSIBLE USE IN LOW TEMPERATURE FUEL CELLS,
AD-433 803 DIV. 7

PHOSPHINES
CHEMICAL BONDS
ENHANCEMENT OF P-H BONDING IN A PHOSPHINE BORINE,
AD-434 269 DIV. 4

PHOSPHONITRILE CHLORIDES
HEAT-RESISTANT PLASTICS
SYNTHESIS OF POLYMERIC POLYDIOXYARYLENEPHOSPHONITRYLATES,
AD-433 578 DIV. 4

PHOSPHORESCENT MATERIALS
QUENCHING (INHIBITION)
OPTICAL QUENCHING AND STIMULATION OF CERTAIN ZNS PHOSPHORS,
AD-434 970 DIV. 25

PHOSPHORUS COMPOUNDS
CHEMICAL REACTION
FOUNDATIONAL RESEARCH PROJECTS OCTOBER-DECEMBER 1963,
AD-433 998 DIV. 8

PHOSPHORUS COMPOUNDS
COMPLEX COMPOUNDS
NEW HYDRIDES OF TRANSITION METALS,
AD-434 555 DIV. 4

PHOTOCHROMISM
AROMATIC COMPOUNDS
RESEARCH ON TRIPLET STATES AND PHOTOCHROMISM,
AD-434 239 DIV. 4

PHOTOELECTRIC CELLS (SEMICONDUCTORS)
COLORIMETRY
COLOR FROM THE METEOROLOGICAL STANDPOINT,
AD-434 391 DIV. 25

PHOTOELECTRIC CELLS (SEMICONDUCTOR)
DISPLAY SYSTEMS
IMPROVED PHOTOCONDUCTORS FOR DISPLAY SWITCHING,
AD-433 671 DIV. 25

PHOTOGRAPHIC RECONNAISSANCE
LOW ALTITIDE
TEST AND EVALUATION OF TA-7H CAMERA MANUFACTURED BY AEROJET DELFT CORPORATION,
AD-433 801 DIV. 24

PHOTOMETERS
ANALYSIS
COMPENSATION PHOTOMETER FOR ACCURATE MEASUREMENTS AND REGISTRATION OF TRANSPARENCY OF ATMOSPHERE,
AD-434 950 DIV. 23

PHTHALATES
POLYAMIDE PLASTICS
SYNTHESIS OF POLYAMIDES CONTAININC S-TRIAZINE RINGS,
AD-433 664 DIV. 4

PHYSIOLOGY
ENDOCRINE GLANDS
ENDOCRINE AND METABOLIC EFFECTS OF SHORT-DURATION HYPEROXIA,
AD-434 424 DIV. 16

PHYSIOLOGY
HIGH ALTITUDE
EFFECT OF CHRONIC HYPOXIA UPON THE CIRCULATION,
AD-433 546 DIV. 16

PILOTS
TERRAIN AVOIDANCE
HUMAN TRACKING ABILITY FOR MAXIMUM TERRAIN FOLLOWING,
AD-435 022 DIV. 19

PIONS
BUBBLE CHAMBERS
INTERACTIONS OF 17 GEV/C NEGATIVE PIONS,
AD-433 625 DIV. 20

PIONS
DIFFUSION
DIFFUSION OF PI-MESONS IN HE3 AND HE4,
AD-433 580 DIV. 25

PIPES
INCOMPRESSIBLE FLOW
AN EXACT ANALYSIS OF LAMINAR FLOW IN THE ENTRANCE REGION OF AN ANNULAR PIPE,
AD-433 880 DIV. 9

PLANING SURFACES
SHIP MODELS
EFFECTS OF LONGITUDINAL BOTTOM SPRAY STRIPS ON PLANING BOAT RESISTANCE,
AD-434 142 DIV. 31

PLANTS (BOTANY)
GROWTH
EFFECTS OF SIMULATED AEROSPACE SYSTEM ENVIRON- MENTS ON THE GROWTH OF SELECTED ANGIOSPERMS,
AD-434 484 DIV. 16

PLANTS (BOTANY)
PHYSIOLOGY
PLANT UPTAKE OF RADIOELEMENTS FROM SOIL,
AD-434 092 DIV. 20

PLASMA MEDIUM
ELECTRON DENSITY
DEVELOPMENT OF LOW-WEIGHT MEASURING APPARATUS FOR ELECTRON DENSITIES IN A PLASMA,
AD-434 894 DIV. 25

PLASMA MEDIUM
GENERATORS
PLASMAS,
AD-434 973 DIV. 25

PLASMA MEDIUM
MAGNETIC FIELDS
THE EFFECTS OF MAGNETIC FIELDS ON A FLOWING PLASMA,
AD-434 097 DIV. 25

PLASMA MEDIUM
TEMPERATURE
CONCERNING THE WARM-UP OF ELECTRONS OF MOVING PLASMA,
AD-434 959 DIV. 25

PLASMA PHYSICS
AIR FORCE RESEARCH
HIGH DENSITY PLASMA PHYSICS,
AD-433 588 DIV. 8

PLASMA PHYSICS
EXHAUST GASES
THE ROLE OF ALUMINUM AND ITS OXIDES AS SOURCES OR MODERATORS OF ELECTRONS IN SOLID PROPELLANT ROCKET EXHAUSTS,
AD-434 699 DIV. 25

PLASMA PHYSICS
LASERS
PLASMA DIAGNOSTICS USING THE RAMAN EFFECT,
AD-434 761 DIV. 25

PLASMA PHYSICS
MICROWAVE AMPLIFIERS
MILLIMETER WAVE COMPONENT DEVELOPMENT (BEAMPLASMA AMPLIFIER),
AD-433 900 DIV. 8

PLASMA PHYSICS
SCIENTIFIC RESEARCH
HYDROMAGNETIC PLASMA RESEARCH,
AD-434 514 DIV. 25

PLASTIC COATINGS
SURFACE PROPERTIES
HYDROPHOBIC AND OLEOPHOBIC FLUOROPOLYMER COATINGS OF EXTREMELY LOW SURFACE ENERGY,
AD-434 213 DIV. 14

PLASTIC SHELLS
VISCOELASTICITY
AXISYMMETRIC, PLANE-STRAIN DYNAMIC RESPONSE OF A THICK, ORTHOTROPIC, VISCOELASTIC SHELL,
AD-433 782 DIV. 28

PLATINUM
OXIDATION
STUDY OF DUCTILE COATINGS FOR THE OXIDATION PRO- TECTION OF COLUMBIUM AND MOLYBDENUM ALLOYS,
AD-434 441 DIV. 17

POLAR REGIONS
ROADS
SNOW COMPACTION IN ANTARCTICA- ROADS ON SNOW-COVERED SEA ICE,
AD-434 118 DIV. 13

POLARIZATION
EXPERIMENTAL DATA
ON THE LINEAR POLARIZATION OF THE RADIATION FROM RADIO SOURCES,
AD-433 094 DIV. 8

POLAROGRAPHIC ANALYSIS
ORGANIC SOLVENTS
POLAROGRAPHIC STUDIES IN CERTAIN NON-AQUEOUS SYSTEMS,
AD-433 699 DIV. 4

POLITICAL SCIENCE
COMMUNISM
ON THE TRAIL OF CHOU EN-LAI IN AFRICA,
AD-433 967 DIV. 32

POLITICAL SCIENCE
DATA
POLITICAL RESEARCH ON CON- TEMPORARY CHINA: SOME PROBLEMS AND OPPORTUNITIES,
AD-434 030 DIV. 32
POLITICAL RESEARCH ON CONTEMPORARY CHINA: SOME PROBLEMS AND OPPORTUN- ITIES,
AD-434 030 DIV. 32

POLITICAL SCIENCE
USSR
THE SOVIET SUCCESSION PROBLEM,
AD-434 070 DIV. 32

POLYAMIDE PLASTICS
SYNTHESIS (CHEMISTRY
SYNTHESIS OF POLYAMIDES CONTAININC S-TRIAZINE RINGS,
AD-433 664 DIV. 4

POLYATOMIC MOLECULES
EXCITATION
INVESTIGATION OF PHOTO EXCITED TRIPLET STATES OF POLYATOMIC MOLECULES BY THE EPR AND PHOSPHORESCENCE METHOD,
AD-433 584 DIV. 25

POLYMERIZATION
ALKYNES
SYNTHESIS AND EVALUATION OF POLYMERS WITH SPECIAL PROPERTIES,
AD-434 229 DIV. 4

POLYMERIZATION
HALOGENATED HYDROCARBONS
PREPARATION AND POLYMERIZATION OF SOME PERFLUORODIENES,
AD-433 087 DIV. 4

POLYMERS
CRYSTAL STRUCTURE
EFFECT OF PLASTICIZER, CHAIN ENDS AND COMONOMER ON THE GLASS TRANSITION TEMPERATURE OF POLYMERS,
AD-434 299 DIV. 4

POLYMERS
SYNTHESIS (CHEMISTRY)
SYNTHESIS AND EVALUATION OF POLYMERS WITH SPECIAL PROPERTIES,
AD-434 229 DIV. 4

POLYMERS
VISCOSITY
DILUTE SOLUTION PROPERTIES OF HIGH-MOLECULAR WEIGHT POLY(ISOBUTYL METHACRYLATE), I. VISCOSITY IN METHYL ETHYL KETONE,
AD-434 893 DIV. 14

POTENTIOMETERS
MANUFACTURING METHODS
PRODUCTION ENGINEERING MEASURE FOR SUBMINIATURE TRANSISTOR TYPE POTENTIOMETERS,
AD-434 065 DIV. 8

POWER
TRANSFORMERS
HIGH POWER, HIGH VOLTAGE, AUDIO FREQUENCY TRANSFORMER DESIGN MANUAL,
AD-434 324 DIV. 7
PRESSURE SUIT PRE-FLIGHT SYSTEM, ACTIVITIES, REQUIREMENTS, AND SPECIFICATIONS,
AD-434 193 DIV. 29

PRIMARY CELLS
LOW-TEMPERATURE BATTERIES
LOW TEMPERATURE OPERATION OF BATTERIES,
AD-433 871 DIV. 7

PROBABILITY
ALGEBRAIC GEOMETRY
PROBLEMS IN PROBABILITY OF A GEOMETRIC NATURE,
AD-434 208 DIV. 13

PROBABILITY
INDUSTRIAL PROCUREMENT
SOME ORDER STATISTICS RELATING TO MARKOV CHAINS: AN APPLICATION TO PURCHASING POLICIES,
AD-433 690 DIV. 24

PROBABILITY
STATISTICAL DISTRIBUTIONS
A GENERAL USE OF THE POISSON APPROXIMATION FOR BINOMIAL EVENTS, WITH APPLICATION TO BACTERIAL ENDOCARDITIS DATA,
AD-433 511 DIV. 13

PROBES (ELECTROMAGNETIC)
PLASMA MEDIUM
THE LANGMUIR PROBE IN A COLLISION- LESS PLASMA,
AD-434 442 DIV. 25

PRODUCTION
DIODES (SEMICONDUCTOR)
SEMICONDUCTOR MATERIALS,
AD-433 725 DIV. 8

PRODUCTION
MANUFACTURING METHODS
PRODUCTION ENGINEERING MEASURE, MECHANIZATION OF SEMICONDUCTOR DEVICES 2N559-2N1099,
AD-433 612 DIV. 8
PRODUCTION ENGINEERING MEASURE FOR IMPROVED RELIABILITY OF SOLID TANTALUM ELECTROLYTIC CAPACITORS,
AD-434 322 DIV. 8
PRODUCTION ENGINEERING MEASURES TO IMPROVE TRANSISTOR RELIABILITY,
AD-434 402 DIV. 8
BL-223 A C-BAND MAGNETRON, PRODUCTION ENGINEER- ING MEASURES PROGRAM, SECTION I, VOLUME I, STEPS I AND II,
AD-434 443 DIV. 8

PRODUCTION
MATHEMATICAL MODELS
MULTI-ITEM PRODUCTION AND INVENTORY MANAGEMENT UNDER PRICE UNCERTAINTY,
AD-433 691 DIV. 26

PRODUCTION
MICROWAVE AMPLIFIERS
HIGH POWER X-BAND GENERATOR,
AD-433 704 DIV. 8

PRODUCTION
OPTIMIZATION
SURVEILLANCE PROBLEMS: WIENER PROCESSES,
AD-433 687 DIV. 26

PRODUCTION
SWITCHING CIRCUITS
FUNCTIONAL CIRCUIT UNITS,
AD-433 711 DIV. 8

PROGRAMMING LANGUAGES
CONTROL SYSTEMS
AUTOMATIC PROGRAMMING TECHNIQUES (PHASE I),
AD-434 760 DIV. 30

PROGRAMMING LANGUAGES
HANDBOOKS
COMPUTER PROGRAM REFERENCE MANUAL OF THE HUDSON LABORATORIES COMPUTING FACILITY VOLUME II, PART II LISTINGS OF BASIC UTILITY PROGRAMS,
AD-433 490 DIV. 30
COMPUTER PROGRAM REFERENCE MANUAL OF THE HUDSON LABORATORIES COMPUTING FACILITY,
AD-433 491 DIV. 30
BRLESC FORTRAN,
AD-434 670 DIV. 30

PROGRAMMING LANGUAGES
MAGNETIC MOMENTS
A FORTRAN III (IBM 7090) PROGRAM FOR THE CALCULATION OF THREE-SUBLATTICE MAGNETIZATIONS,
AD-434 924 DIV. 30

PROGRAMMING (COMPUTERS)
COMMUNICATION SYSTEMS
LINK EVALUATION AND TAPE MERGING COMPUTER PROGRAMS,
AD-434 833 DIV. 30
THE NETWORK ROUTING AND EVALUATION PROGRAM,
AD-434 835 DIV. 5

PROGRAMMING (COMPUTERS)
CONTROL SYSTEMS
METHODOLOGIES FOR SYSTEM DESIGN,
AD-434 748 DIV. 30
METHODOLOGIES FOR SYSTEM DESIGN,
AD-434 749 DIV. 30

PROGRAMMING (COMPUTERS)
DATA PROCESSING SYSTEMS
DATA PROCESSING, LEAST SQUARES PREPARATION, AND PATTERSON SHARPENING PROGRAMS FOR THE CONTROL DATA CORPORATION 1604,
AD-434 158 DIV. 30
AUTOMATIC PROGRAMMING TECHNIQUES (PHASE I),
AD-434 760 DIV. 30

PROGRAMMING (COMPUTERS)
HANDBOOKS
COMPUTER PROGRAM REFERENCE MANUAL OF THE HUDSON LABORATORIES COMPUTING FACILITY VOLUME II, PART II LISTINGS OF BASIC UTILITY PROGRAMS,
AD-433 490 DIV. 30
COMPUTER PROGRAM REFERENCE MANUAL OF THE HUDSON LABORATORIES COMPUTING FACILITY,
AD-433 491 DIV. 30
OPTIMIZING STATISTICAL ANALYSIS: DATA SCREENING AND PRECONDITIONING,
AD-433 551 DIV. 30

PROGRAMMING (COMPUTERS)
NETWORKS
OUTPUTS FROM THE NETWORK ANALYSIS COMPUTER PROGRAMS: A SUMMARY REPORT,
AD-434 834 DIV. 30

PROGRAMMING (COMPUTERS)
NONLINEAR SYSTEMS
DECENTRALIZED MANAGEMENT OF INTERACTING PROCESSES: A TECHNIQUE OF NONLINEAR PROGRAMMING (II),
AD-433 688 DIV. 30
DECENTRALIZED MANAGEMENT OF INTERACTING PROCESSES: A TECHNIQUE OF NONLINEAR PROGRAMMING,
AD-433 689 DIV. 30

PROGRAMMING (COMPUTERS)
OPTIMIZATION
PROPELLANT OPTIMIZATION PROGRAM FOR COMPUTERS MATHEMATICAL PROCEDURES AND PROGRAMMING,
AD-433 734 DIV. 30
A COMPARISON BETWEEN SOME METHODS FOR COMPUTING OPTIMUM PATHS IN THE PROBLEM OF BOLZA,
AD-434 225 DIV. 19
NUMERICAL STUDIES OF A TWO-POINT NONLINEAR BOUNDARY VALUE PROBLEM USING DYNAMIC PROGRAMMING, INVARIANT IMBEDDING, AND QUASILINEARIZATION,
AD-434 561 DIV. 19

Projectiles)
FEASIBILITY STUDIES
PRODUCT IMPROVEMENT TEST OF CARTRIDGE, 105-MM, HEP-T, M393A1, (ADAPTION OF TRACER, XM1E1),
AD-434 376 DIV. 22A

PROJECTIVE TECHNIQUES
GROUP DYNAMICS
STRATEGY IN THREE GAMES: A REPLICATION,
AD-433 863 DIV. 28

PROPAGATION
VERY LOW FREQUENCY
EXTRA LONG WAVES PROPAGATION WITH ROCKETS,
AD-434 771 DIV. 8
PROPAGATION OF VLF WAVES IN HIGHLY CONDUCTING MEDIUM,
AD-434 776 DIV. 2

PROPELLANT GRAINS
GAS GENERATING SYSTEMS
FEASIBILITY TESTING OF A NITROGEN-GENERATING SOLID CHARGE (SODIUM AZIDE) FOR PROPELLANT TANK PRESSURIZATION,
AD-433 729 DIV. 10

PROPELLANT TANKS
CORROSION
EVALUATION OF THE MECHANISM OF CORROSION IN CAPILLARIES, OXIDIZER DIFFUSION STUDIES,
AD-433 622 DIV. 10

PROPELLANTS
OPTIMIZATION
PROPELLANT OPTIMIZATION PROGRAM FOR COMPUTERS MATHEMATICAL PROCEDURES AND PROGRAMMING,
AD-433 734 DIV. 30

PROPELLERS (AERIAL)
MATHEMATICAL MODELS
THE GENERALIZED ACTUATOR DISK,
AD-433 976 DIV. 9

PROPELLERS (MARINE)
LANDING CRAFT
PROPULSION CHARACTERISTICS OBTAINED WITH VERTICAL AXIS PROPELLERS FOR LCU (A) REPRESENTED BY MODEL 4952,
AD-434 581 DIV. 31
RESISTANCE CHARACTERISTICS OBTAINED WITH VERTICAL AXIS PROPELLERS FOR LCU(A) REPRESENTED BY MODEL 4952,
AD-434 703 DIV. 31

PROPELLERS (MARINE)
MATHEMATICAL MODELS
THE GENERALIZED ACTUATOR DISK,
AD-433 976 DIV. 9
CAVITATION PERFORMANCE OF PROPELLERS IN A SUBMARINE WAKE,
AD-434 185 DIV. 31
OPEN-WATER AND CAVITATION PERFORMANCE OF THE PROPELLER FOR SARGO SS(N)583,
AD-434 288 DIV. 31

PROPELLING CHARGES
DESIGN
DEVELOPMENT OF XML24 (GREEN GAG) PROPELLING CHARGE FOR THE L75MM GUN,
AD-434 660 DIV. 22

PROPULSION
SHIPS (NONMILITARY)
POWER PREDICTIONS FOR A VEHICLE CARGO SHIP (T-LSV-RO/RO) REPRESENTED BY MODEL 4937,
AD-433 952 DIV. 9

PROTECTIVE TREATMENTS
AIRCRAFT FINISHES
THE DEVELOPMENT OF A NEW TYPE MASKING COMPOSITION FOR O+R OPERATIONS,
AD-434 183 DIV. 1

PROTONS
ELASTIC SCATTERING
CONCERNING ELASTIC SCATTERING OF PROTONS OF LARGE ENERGIES,
AD-434 964 DIV. 20

PROTONS
RADIOBIOLOGY
THE BIOLOGICAL ACTION OF HIGH ENERGY FAST NEUTRONS AND PROTONS,
AD-433 529 DIV. 16

PSYCHOLOGY
CIRCUITS
THE PSYCHOLOGICAL DIMENSIONALITY OF BASIC ELECTRONIC CIRCUITS: II. INTERPRETATION OF THE STATISTICAL DIMENSIONS,
AD-434 251 DIV. 28

PSYCHOLOGY
FACTOR ANALYSIS
THREE-WAY FACTOR ANALYSIS OF A MULTITRAIT-MULTIMETHOD MATRIX,
AD-434 211 DIV. 28

PSYCHOLOGY
VOICE COMMUNICATION SYSTEMS
CROSS-CULTURAL INVESTIGATION OF SOME FACTORS IN PERSUASION AND ATTITUDE CHANGE. ORDER EFFECTS IN PERSUASION,
AD-433 792 DIV. 28

PULSE COMMUNICATION SYSTEMS
RADIO INTERFERENCE
ELECTRONIC EQUIPMENT INTERFERENCE CHARACTERISTICS COMMUNICATION TYPE,
AD-433 705 DIV. 8

PULSE GENERATORS
ION SOURCES
HIGH-VOLTAGE PULSE MODE OF IONIC SOURCE PENNING,
AD-434 960 DIV. 23

PULSE TRANSMITTERS
MATCHED FILTERS
OPTIMUM PULSE SHAPES FOR TRANSMITTERS WHICH ARE BOTH PEAK POWER LIMITED AND AVERAGE POWER LIMITED,
AD-434 875 DIV. 5

PUMPS
SUBMARINE NOISE
SUBMARINE SEA-CONNECTED PUMPING SYSTEM NOISE REDUCTION STUDY - PHASE I,
AD-434 701 DIV. 31

PURIFICATION
OPTIMIZATION
OPTIMUM PURIFICATION TECHNIQUES FOR THE REMOVAL OF CONTAMINANTS FROM LIQUID LITHIUM AND RUBIDIUM,
AD-434 544 DIV. 30

PYROPHORIC MATERIALS
INCENDIARY GELS
INVESTIGATION OF ALKYL ALUMINUM COMPOUNDS,
AD-434 327 DIV. 3

PYROTECHNICS
FLOWS
EVALUATION OF NONGASEOUS HIGH ALTITUDE FLARE COMPOSITIONS,
AD-434 664 DIV. 3

QUANTUM MECHANICS
DYNAMICS
REMOVAL OF DIVERGENCES IN QUANTUM ELECTRODYNAMICS,
AD-434 498 DIV. 25

QUARTZ
SINGLE CRYSTALS
QUARTZ CRYSTAL AGING EFFECTS,
AD-434 674 DIV. 8

QUARTZ
TESTS
PRODUCTION ENGINEERING MEASURE,
AD-434 436 DIV. 8

QUARTZ RESONATORS
CRYSTAL OSCILLATORS
QUARTZ CRYSTAL OSCILLATOR CIRCUITS STUDY,
AD-433 816 DIV. 8

QUARTZ RESONATORS
MANUFACTURING METHODS
PRODUCTION ENGINEERING MEASURE CR-(XM-40)/U HIGH-PRECISION CRYSTAL UNITS,
AD-434 345 DIV. 8

QUARTZ RESONATORS
RELIABILITY
QUARTZ CRYSTAL AGING EFFECTS,
AD-434 674 DIV. 8

QUEUEING THEORY
MODELS (SIMULATIONS)
A QUEUEING MODEL FOR DETERMINING SYSTEM MANNING AND RELATED SUPPORT REQUIREMENTS,
AD-434 803 DIV. 19

RADAR EQUIPMENT
ERRORS
ACCURACY OF METEOROLOGICAL DATA OBTAINED BY TRACKING THE ROBIN WITH MPS-19 RADAR,
AD-434 379 DIV. 2
BRITISH RADAR RESEARCH,
AD-348 436L DIV. 6A

RADAR EQUIPMENT
WEATHER STATIONS
WEATHER RADAR TECHNIQUE DEVELOPMENT,
AD-433 912 DIV. 2

RADAR PULSES
DISTORTION
THE DISTORTION CUMULONIMBUS PRECIPITATION OB- SERVED BY RADAR,
AD-434 779 DIV. 2

RADAR RANGE COMPUTER
STABILIZATION
OLS STABILIZATION EQUIPMENT MODEL 36M2 OPERATING INSTRUCTION MANUAL,
AD-435 055 DIV. 30

RADAR TRACKING
FEASIBILITY STUDIES
COLLECTIVE PROTECTION EQUIPMENT FOR THE AN/MSG-4 SYSTEM PHASES II AND III DEVELOPMENT, FABRICATION, AND TEST,
AD-433 872 DIV. 3

RADIATION CHEMISTRY
AROMATIC COMPOUNDS
RADICAL YIELDS IN IRRADIATED AROMATICS,
AD-434 046 DIV. 4

RADIATION DAMAGE
ABSTRACTS
MONTHLY ACCESSION LIST, ABSTRACT NO. 22919 TO 23001, PART I,
AD-434 600 DIV. 14

RADIATION DAMAGE
SEMICONDUCTORS
INVESTIGATION OF TRANSIENT RADIATION DAMAGE IN SEMICONDUCTOR MATERIALS,
AD-433 623 DIV. 8

RADIATION DAMAGE
SOLAR CELLS
WEBBED DENDRITIC SILICON SOLAR CELL RADIATION EFFECTS INVESTIGATION,
AD-434 706 DIV. 7

RADIATION DAMAGE
THERMAL RADIATION
EFFECT OF HIGH THERMAL RADIATION FLUX ON SEVERAL METAL ALLOYS,
AD-434 448 DIV. 17

RADIATION EFFECTS
BONE
A PERSISTENT BONE GROWTH DEFICIT IN THE X- IRRADIATED RAT,
AD-434 219 DIV. 16

RADIATION EFFECTS
HEMATOLOGY
HEMATOLOGICAL CHANGES IN BEAGLES AFTER IRRADIATION BY NEUTRONS, X-RAY, AND RADIONUCLIDES
AD-433 980 DIV. 16

RADIATION EFFECTS
MAGNETIC AMPLIFIERS
PERFORMANCE OF RADIATION-RESISTANCE MAGNETIC AMPLIFIER CONTROLS UNDER FAST NEUTRON AND GAMMA IRRADIATION,
AD-435 095 DIV. 8

RADIATION EFFECTS
NEOPLASMS
CARCINOGENESIS BY FAST NEUTRONS RELATIVE TO X RAYS IN MICE: EFFECT OF UNINEPHRECTOMY AND OF CCL4,
AD-433 886 DIV. 16

RADIATION EFFECTS
STRUCTURES
THE EFFECT OF LIMITED STRIPS OF CONTAMINATION ON THE DOSE RATE IN A MULTISTORY, WINDOWLESS STRUCTURE WITH 40 PSF WALLS AND 50 PSF FLOORS,
AD-434 787 DIV. 20

RADIATION HAZARDS
INDEXES
AN INDEX TO U.S. NAVAL RADIOLOGICAL DEFENSE LABORATORY TECHNICAL REPORTS (TR SERIES) ISSUED FROM 1 JANUARY THROUGH 31 DECEMBER 1963,
AD-433 928 DIV. 20

RADIATION MEASUREMENT SYSTEMS
RADIOLOGICAL CONTAMINATION
THE EFFECT OF LIMITED STRIPS OF CONTAMINATION ON THE DOSE RATE IN A MULTISTORY, WINDOWLESS STRUCTURE WITH 40 PSF WALLS AND 50 PSF FLOORS,
AD-434 788 DIV. 20

RADIO COMMUNICATION SYSTEMS
INTERFERENCE
COMPARISON OF PRECIPITATION AND TROPOSPHERIC SCATTERING CROSS SECTIONS,
AD-434 836 DIV. 5

RADIO INTERFERENCE
TEST SETS
RADIO INTERFERENCE MEASURING SET AN/URM-100 (XE-1),
AD-434 979 DIV. 30

RADIO INTERFEROMETERS
FREQUENCY
THE SPACE-FREQUENCY SPECTRUM OF HIGH-RESOLUTION RADIO INTERFEROMETERS,
AD-433 609 DIV. 30

RADIO RECEIVERS
CHANNEL SELECTORS
COMPARISON OF TECHNICAL SPECIFICATIONS FOR THREE TWIN/TRIPLE CHANNEL HF RECEIVERS,
AD-434 335 DIV. 5

RADIO RECEIVERS
SPECIFICATIONS
COMPARISON OF TECHNICAL SPECIFICATIONS FOR THREE TWIN/TRIPLE CHANNEL HF RECEIVERS,
AD-434 335 DIV. 5

RADIO SIGNALS
PROPAGATION
HF COMMUNICATION EFFECTS SIMULATION: INSTRUMENTATION AND OPERATION OF THE FIELD EXPERIMENT,
AD-434 554 DIV. 5

RADIOACTIVE FALLOUT
RADIOLOGICAL CONTAMINATION
THE EFFECT OF LIMITED STRIPS OF CONTAMINATION ON THE DOSE RATE IN A MULTISTORY, WINDOWLESS STRUCTURE WITH 40 PSF WALLS AND 50 PSF FLOORS,
AD-434 788 DIV. 20

RADIOBIOLOGY
NUCLEAR REACTIONS
THE BIOLOGICAL ACTION OF HIGH ENERGY FAST NEUTRONS AND PROTONS,
AD-433 529 DIV. 16

RADIOFREQUENCY
ATTENUATORS
RF ATTENUATION MEASURING TECHNIQUES,
AD-433 742 DIV. 28

RADIOFREQUENCY INTERFERENCE
SYMPOSIA
PROCEEDINGS OF THE NINTH TRI-SERVICE CONFERENCE ON ELECTROMAGNETIC COMPATIBILITY,
AD-434 850 DIV. 8

RADIOLOGICAL CONTAMINATION
BUILDINGS
THE EFFECT OF LIMITED STRIPS OF CONTAMINATION ON THE DOSE RATE IN A MULTISTORY, WINDOWLESS STRUCTURE WITH 40 PSF WALLS AND 50 PSF FLOORS,
AD-434 788 DIV. 20

RADIOLOGICAL CONTAMINATION
WATER SUPPLIES
VULNERABILITY OF MUNICIPAL WATER FACILITIES TO RADIOACTIVE CONTAMINATION FROM NUCLEAR ATTACKS,
AD-434 091 DIV. 20

RADIOMETERS
FLARES
DESIGN STUDY FOR INFRARED MEASUREMENT OF PYROTECHNIC FLARES,
AD-433 964 DIV. 30
SYNTHESIS OF POTENTIAL ANTIRADIATION DRUGS,
AD-434 058 DIV. 4

RADIOSONDES
MEASUREMENTS
TIME VARIATIONS IN COSMIC RAYS AND RADIOSONDE MEASUREMENTS,
AD-434 540 DIV. 2
A PARAMETRIC STUDY AND SURVEY OF THE THEORETICAL PERFORMANCE OF THE SUBSONIC COMBUSTION RAMJET,
AD-433 723 DIV. 27

RANGE FINDING
LASERS
FEASIBILITY OF A LUNAR OPTICAL RANGING EXPERIMENT,
AD-434 586 DIV. 25

REACTION KINETICS
NUCLEATION
KINETICS OF CONDENSATION FROM THE VAPOR PHASE,
AD-434 284 DIV. 4

REACTOR SAFETY SYSTEMS
CONFINEMENT
THE PLASTIC RESPONSE TO INTERNAL BLAST LOADING OF MODELS OF OUTER CONTAINMENT STRUCTURES FOR NUCLEAR REACTORS,
AD-433 618 DIV. 20

REACTOR SYSTEM COMPONENTS
RADIATION DAMAGE
IRRADIATION EFFECTS ON REACTOR STRUCTURAL MATERIALS,
AD-433 675 DIV. 20

REASONING
PERFORMANCE TESTS
THE PSYCHOLOGICAL DIMENSIONALITY OF BASIC ELECTRONIC CIRCUITS: II. INTERPRETATION OF THE STATISTICAL DIMENSIONS,
AD-434 251 DIV. 28

RECOMBINATION REACTIONS
IODINE
FURTHER STUDIES OF IODINE ATOM RECOMBINATION,
AD-434 714 DIV. 4

REENTRY VEHICLES
AERODYNAMIC CONFIGURATIONS
PRESSURE MEASUREMENTS FOR MACH FIVE FLOWS OVER WINGED RE-ENTRY CONFIGURATIONS WITH AERODYNAMIC CONTROLS, PART II. CONICAL CABIN CONFIGURATION,
AD-433 619 DIV. 9

REENTRY VEHICLES
AUXILIARY POWER PLANTS
EFFECT OF REYNOLDS NUMBER ON TURBINE PERFORMANCE AT VARIOUS MACH NUMBERS,
AD-433 589 DIV. 12

REENTRY VEHICLES
FLIGHT CONTROL SYSTEMS
FIXED-BASE AND IN-FLIGHT SIMULATIONS OF LONGITUDINAL AND LATERAL-DIRECTIONAL HANDLING QUALITIES FOR PILOTED RE-ENTRY VEHICLES,
AD-434 076 DIV. 12

REENTRY VEHICLES
MANEUVERABILITY
POINT-MASS TRAJECTORY DATA FOR MANEUVERABLE BALLISTIC MISSILE RE-ENTRY VEHICLES,
AD-434 165 DIV. 12

REENTRY VEHICLES
PARAWINGS
PROJECT FIRST,
AD-434 396 DIV. 12

REFLECTION
INHIBITION
CREATORS OF ANTI-REFLECTION COATED OPTICS,
AD-433 532 DIV. 7

REFRACTORY COATINGS
REFRACTORY METALS AND ALLOYS
PROPERTIES OF COATED REFRACTORY METALS,
AD-433 702 DIV. 17

REFRACTORY MATERIALS
BIBLIOGRAPHY
MATERIALS FOR RE-ENTRY, A SELECTED BIBLIOGRAPHY, 1959-1963,
AD-433 656 DIV. 12

REFRACTORY MATERIALS
SYNTHESIS (CHEMISTRY)
DEVELOPMENT AND UTILIZATION OF OPTIMUM TECHNIQUES FOR THE FABRICATION OF TITANIUM BORONITRIDE ROCKET NOZZLES,
AD-433 662 DIV. 27

REFRACTORY METALS AND ALLOYS
BIBLIOGRAPHY
MATERIALS FOR RE-ENTRY, A SELECTED BIBLIOGRAPHY, 1959-1963,
AD-433 656 DIV. 12

REFRACTORY METALS AND ALLOYS
CRYSTAL STRUCTURE
RESEARCH CONDUCTED ON SECRETARY OF ARMY RESEARCH AND STUDY FELLOWSHIP TRANSMISSION ELECTRON MICROSCOPY,
AD-434 112 DIV. 17

REFRACTORY METALS AND ALLOYS
REFRACTORY COATINGS
PROPERTIES OF COATED REFRACTORY METALS,
AD-433 702 DIV. 17

REFRACTORY METALS + ALLOYS
FOILS
REFRACTORY ALLOY FOIL ROLLING DEVELOPMENT PROGRAM,
AD-434 397 DIV. 17

REFRACTORY METALS + ALLOYS
MECHANICAL WORKING
THE USE OF STRAIN SOFTENING TO IMPROVE THE PROPERTIES OF REFRACTORY METALS,
AD-434 207 DIV. 17

REFRACTORY METALS + ALLOYS
REFRACTORY MATERIALS
MATERIALS FOR RE-ENTRY, A SELECTED BIBLIOGRAPHY, 1959-1963,
AD-433 656 DIV. 12

REINFORCED CONCRETE
BEAMS (STRUCTURAL)
BEHAVIOR OF SIMPLE AND RESTRAINED DEEP REINFORCED CONCRETE BEAMS UNDER STATIC LOADING,
AD-434 074 DIV. 13

REINFORCED CONCRETE
ULTRASONIC RADIATION
ULTRASOUND,
AD-434 996 DIV. 13

RELIABILITY
PROBABILITY
SKEWED LOAD-STRENGTH DISTRIBUTION IN RELIABILITY,
AD-434 414 DIV. 19

RELIABILITY (ELECTRONICS)
BIBLIOGRAPHIES
BIBLIOGRAPHY ON THE USE OF REDUNDANCY AS A MEANS OF IMPROVING RELIABILITY,
AD-433 614 DIV. 8

RELIABILITY (ELECTRONICS)
ELECTRONIC EQUIPMENT
PHYSICS OF FAILURE IN ELECTRONICS, VOLUME 2,
AD-434 329 DIV. 8

REMOTE CONTROL SYSTEMS
LIQUID LEVEL CONTROL
EVALUATION TESTS OF FLOAT-ACTUATED ELECTRICAL LIQUID LEVEL INDICATING SYSTEM MANUFACTURED BY LIQUIDOMETER CORPORATION,
AD-433 957 DIV. 30

REPORTS
LAUNCH VEHICLES (AEROSPACE)
ATHENA DOCUMENTATION HANDBOOK,
AD-434 167 DIV. 12

REPORTS
SCIENTIFIC RESEARCH
MATERIALS SCIENCES RESEARCH,
AD-433 811 DIV. 19

REPORTS
USSR
FUTURE TRENDS IN SOVIET SCIENCE AND TECHNOLOGY, REVIEW

OF SOVIET LITERATURE,
AD-435 019 DIV. 32

RESEARCH PROGRAM ADMINISTRATION
COSTS
A DISCUSSION OF SPACE PROGRAM COSTS,
AD-433 852 DIV. 32

RESEARCH PROGRAM ADMINISTRATION
ENVIRONMENTAL TESTS
THE AIR FORCE WEAPON SYSTEM ENVIRONMENTAL PROGRAM,
AD-433 882 DIV. 30

RESEARCH REACTORS
DESIGN
A SUBTHERMAL NEUTRON BEAM COLLIMATED BY TOTAL REFLECTION,
AD-433 615 DIV. 20

RESISTANCE (ELECTRICAL)
MAGNETIC FIELDS
MAGNETORESISTANCE EFFECT IN ADVANCE AND EVANOHM WIRES AT LOW TEMPERATURES IN FIELDS UP TO 50 KILOGAUSS,
AD-434 385 DIV. 25
RESISTANCE MINIMUM IN EVANOHM WIRE,
AD-434 386 DIV. 25

RESISTANCE (ELECTRICAL)
MATERIALS
SYSTEM FOR MEASURING SEEBECK COEFFICIENT AND RESISTIVITY,
AD-433 673 DIV. 30

RESISTORS
FAILURE (MECHANICS)
STUDY OF COMPREHENSIVE FAILURE THEORY,
AD-434 794 DIV. 8

RESONANCE
NONLINEAR SYSTEMS
CONCERNING RESONANCE IN AN ESSENTIALLY NONLINEAR SYSTEM,
AD-434 998 DIV. 25

RETINA
BURNS
EFFECTS OF THERMAL ENERGY ON RETINAL FUNCTION,
AD-434 726 DIV. 16

REVIEWS
SCIENTIFIC RESEARCH
FUTURE TRENDS IN SOVIET SCIENCE AND TECHNOLOGY, REVIEW OF SOVIET LITERATURE,
AD-435 019 DIV. 32

REVIEWS
SPECTROSCOPY
DETECTION OF THE TRIPLET STATE BY EPR AND OTHER METHODS, COMPILATION OF ABSTRACTS BASED ON SOVIET OPEN LITERATURE,
AD-434 712 DIV. 25

RHENIUM COMPOUNDS
COMPLEX COMPOUNDS
NEW HYDRIDES OF TRANSITION METALS,
AD-434 555 DIV. 4

RHODIUM COMPOUNDS
COMPLEX COMPOUNDS
NEW HYDRIDES OF TRANSITION METALS,
AD-434 555 DIV. 4

RINGS
ANALYSIS
PARAMETRIC EXPANSIONS FOR OVAL REINFORCING RINGS,
AD-434 738 DIV. 25

ROADS
SNOW
SNOW COMPACTION IN ANTARCTICA-ROADS ON SNOW-COVERED SEA ICE,
AD-434 118 DIV. 13

ROCK (GEOLOGY)
PROPAGATION
PROPAGATION OF VLF WAVES IN HIGHLY CONDUCTING MEDIUM,
AD-434 776 DIV. 2

ROCKET CASES
DESIGN
DESIGN, DEVELOPMENT AND FABRICA' OF ULTRA-HIGH STRENGTH SOLID PROPELLANT ROCKET MOTOR CASES,
AD-433 809 DIV. 27

ROCKET CASES
GLASS TEXTILES
DEVELOPMENT OF HIGH-STRENGTH IMPREGNATED ROVING FOR FILAMENT WINDING,
AD-435 034 DIV. 14

ROCKET CASES
LOADING (MECHANICS)
WING II HOT STRUCTURAL DEVELOPMENT TESTS, WEAPON SYSTEM L33A,
AD-434 178 DIV. 27

ROCKET CASES
STRETCH FORMING
CRYOGENIC STRETCH-FORMING OF SOLID-PROPELLANT ROCKET CASES,
AD-434 892 DIV. 27

ROCKET MOTOR NOZZLES
DESIGN
INTERNAL ENVIRONMENT OF SOLID ROCKET NOZZLES,
AD-434 129 DIV. 27

ROCKET MOTOR NOZZLES
HEAT TRANSFER
LOCAL HEAT-TRANSFER COEFFICIENTS IN A NOZZLE WITH HIGH-SPEED LAMINAR FLOW,
AD-434 369 DIV. 27

ROCKET MOTOR NOZZLES
MATERIAL FORMING
DEVELOPMENT AND UTILIZATION OF OPTIMUM TECHNIQUES FOR THE FABRICATION OF TITANIUM BORONITRIDE ROCKET NOZZLES,
AD-433 662 DIV. 27

ROCKET MOTOR NOZZLES
RINGS
CRYOGENIC STRETCH-FORMING OF SOLID-PROPELLANT ROCKET CASES,
AD-434 892 DIV. 27

ROCKET MOTORS (LIQUID PROPELLANT)
TEXTBOOKS
ROCKET MOTORS (RAKETNAYA TEKHNIKA),
AD-434 968 DIV. 12

ROCKET MOTORS (SOLID PROPELLANT)
ROCKET CASES
DESIGN, DEVELOPMENT AND FABRICATIC OF ULTRA-HIGH STRENGTH SOLID PROPELLANT ROCKET MOTOR CASES,
AD-433 809 DIV. 27
WING II HOT STRUCTURAL DEVELOPMENT TESTS, WEAPON SYSTEM L33A,
AD-434 178 DIV. 27

ROCKET MOTORS (SOLID PROPELLANT)
TEXTBOOKS
ROCKET MOTORS (RAKETNAYA TEKHNIKA),
AD-434 968 DIV. 12

ROCKET PLANES
AIR TRANSPORTATION
AIRCRAFT TODAY--SPACECRAFT TOMORROW,
AD-433 535 DIV. 33

ROTATING BANDS
PROJECTILES
EXAMINATION OF ROTATING BANDS FROM 155MM PROJECTILE, HE, M107, FIRED WITH PROPELLANT CHARGE XM119,
AD-434 580 DIV. 22

ROTOR BLADES (ROTARY WINGS)
BRAKES
EVALUATION OF THE QH-50C DRONE HELICOPTER,
AD-434 039L DIV. 1A

RUBIDIUM
LIQUID METALS
OPTIMUM PURIFICATION TECHNIQUES FOR THE REMOVAL OF CONTAMINANTS FROM LIQUID LITHIUM AND RUBIDIUM,
AD-434 544 DIV. 30

RUNWAYS
PAINTS
INITIAL FIELD TESTING OF AIRFIELD MARKING PAINTS,
AD-434 891 DIV. 13

RUPTURE
STRESSES
TIME-TEMPERATURE PARAMETER FOR RUPTURE STRESSES IN NIMONIC 80A AND MONEL, USING MECHANICAL CHEMICAL EQUATIONS OF STATE,
AD-434 066 DIV. 17

SALINITY
MEASUREMENT
OCEANOGRAPHIC MANUSCRIPT ON THE RELIABILITY OF FIELD MEASUREMENTS OF SALINITY WITH THE INDUCTIVE SALINOMETER,
AD-435 056 DIV. 2

SALINOMETERS
OCEANOGRAPHIC EQUIPMENT
OCEANOGRAPHIC MANUSCRIPT ON THE RELIABILITY OF FIELD MEASUREMENTS OF SALINITY WITH THE INDUCTIVE SALINOMETER,
AD-435 056 DIV. 2

SALTS
HIGH-TEMPERATURE RESEARCH
PROPERTIES OF SOLUTIONS OF METALS IN MOLTEN SALTS,
AD-434 538 DIV. 4

SAMPLING
LEAST SQUARES METHOD
LEAST-SQUARES ESTIMATION OF PARAMETERS FOR ASYMPTOTES OF EXTREMES,
AD-433 836 DIV. 19

SATELLITE NETWORKS
OPTIMIZATION
EARTH COVERAGE BY SATELLITE CONFIGURATIONS,
AD-433 606 DIV. 12

SATELLITES (ARTIFICIAL)
FLIGHT
FROM THE FIRST SATELLITE TO GROUP FLIGHT,
AD-433 533 DIV. 12
A SYSTEMATIC APPROACH TO THE CHOICE OF STATION LOCATIONS FOR LOW-ALTITUDE SATELLITE TRACKING IN NEAR EQUATORIAL ORBITS,
AD-433 753 DIV. 12

SATELLITES (ARTIFICIAL)
WEATHER STATIONS
WEATHER SATELLITE DATA PROCESSING,
AD-433 731 DIV. 2

SCANNING
ERRORS
EXPERIMENTAL RESULTS CONCERNING THE CONICAL SCANNING ERROR SIGNAL OF A BROAD-BAND ANTENNA SYSTEM,
AD-433 489 DIV. 8

SCHEDULING
FEASIBILITY STUDIES
SOME PROPERTIES OF SCHEDULES FOR LARGE PROJECTS WITH LIMITED RESOURCES,
AD-435 050 DIV. 28

SCIENTIFIC RESEARCH
MATERIALS
MATERIALS SCIENCES RESEARCH,
AD-433 811 DIV. 14

SCIENTIFIC RESEARCH
MILITARY PUBLICATIONS
PROFESSIONAL PAPERS CLEARED FOR POSSIBLE PUBLICATION AND/OR PRESENTATION,
AD-434 255 DIV. 32

SCIENTIFIC RESEARCH
RADAR EQUIPMENT
BRITISH RADAR RESEARCH,
AD-348 436L DIV. 6A

SCIENTIFIC RESEARCH
THERMIONIC CONVERTERS
RESEARCH STUDIES ON THERMIONIC CONVERTERS, EMIT- TER SHELL PHASE,
AD-434 908 DIV. 8

SECONDARY INJECTION
PNEUMATIC VALVES
LINEAR PROPORTIONAL CONTROL HOT GAS VALVE FOR SECONDARY INJECTION,
AD-433 751 DIV. 27

SECRET COMMUNICATION SYSTEMS
SPACE COMMUNICATION SYSTEMS
SCATTER COMMUNICATION MODELS FOR SPACE VEHICLES,
AD-433 717 DIV. 5

SEISMOGRAPHS
DIGITAL SYSTEMS
BROADBAND DIGITAL SEISMOMETER EVALUATION,
AD-433 679 DIV. 2

SELENIDES
ZINC COMPOUNDS
LONG WAVELENGTH INFRARED DOMES,
AD-433 950 DIV. 14

SEMICONDUCTOR DEVICES
INTEGRATED CIRCUITS
OPTOELECTRONIC FUNCTIONAL ELECTRONIC BLOCKS,
AD-434 170 DIV. 8

SEMICONDUCTOR DEVICES
LASERS
SEMICONDUCTOR DEVICE CONCEPTS,
AD-433 975 DIV. 8

SEMICONDUCTOR DEVICES
MANUFACTURING METHODS
PRODUCTION ENGINEERING MEASURE, MECHANIZATION OF SEMICONDUCTOR DEVICES, 2N560, 2N1051, 2N1072, 2N1195, 1N664, 1N665, 1N666, 1N667, 1N668, 1N669, 1N673, 1N675, 1N697 AND 1N701,
AD-433 773 DIV. 8
PROCESS AND FLOW CHART MANUAL FOR INTERDIGITATED SILICON TRANSISTOR PROGRAM,
AD-434 331 DIV. 8

SEMICONDUCTOR DEVICES
PHASE SHIFTERS
HIGH POWER SEMICONDUCTOR PHASE SHIFTING DEVICES,
AD-434 747 DIV. 8

SEMICONDUCTORS
EPITAXIAL GROWTH
EPITAXIAL VAPOR GROWTH OF III-V COMPOUNDS,
AD-434 756 DIV. 25

SEMICONDUCTORS
FAILURE (MECAHNICS)
FAILURE MECHANISMS IN SILICON SEMICONDUCTORS,
AD-434 762 DIV. 8

SEMICONDUCTORS
PHOTOCONDUCTIVITY
IMPROVED PHOTOCONDUCTORS FOR DISPLAY SWITCHING,
AD-433 671 DIV. 25

SEMICONDUCTORS
RADIATION DAMAGE
INVESTIGATION OF TRANSIENT RADIATION DAMAGE IN SEMICONDUCTOR MATERIALS,
AD-433 623 DIV. 8

SEMICONDUCTORS
SOLID STATE PHYSICS
AUGER EFFECTS INVOLVING RECOMBINATION CENTERS,
AD-434 593 DIV. 25

SEMICONDUCTORS
THERMOELECTRICITY
INVESTIGATION OF THE SURFACE OPTICAL PROPERTIES OF OXIDES AS A FUNCTION OF COMPOSITION,
AD-434 372 DIV. 25

SEMICONDUCTORS
TIN
TRANSPORT PROPERTIES AND BAND STRUCTURE OF GRAY TIN,
AD-435 042 DIV. 25

SENSITIVITY
CIRCUITS
OPTIMIZATION OF POLE SENSITIVITY IN ACTIVE RC NETWORKS,
AD-434 240 DIV. 8

SEQUENCES
OPTIMIZATION
OPTIMAL PROGRAMS FOR SEQUENTIAL INVESTMENTS,
AD-433 699 DIV. 18

SERVOMECHANISMS
TRACKING TELESCOPES
ANALYSIS OF SERVOMECHANISMS FOR CONTROL OF ELECTRO-OPTICAL SURVEILLANCE TELESCOPES,
AD-433 916 DIV. 6

SEWAGE
DEGRADATION
GROSS CHEMICAL CHANGES OF HUMAN WASTE UNDERGOING THERMAL DECOMPOSITION,
AD-434 081 DIV. 4

SEWAGE
GROWTH SUBSTANCES
EFFECTS OF SIMULATED AEROSPACE SYSTEM ENVIRON- MENTS ON THE GROWTH OF SELECTED ANGIOSPERMS,
AD-434 684 DIV. 14

SHEAR STRESSES
MEASUREMENT
SHEAR STRESS MEASUREMENTS IN SITU OF SOILS SUBJECTED TO VIBRATORY LOADS,
AD-433 800 DIV. 25

SHELTERS
STRUCTURAL PARTS
MODEL STUDIES OF LARGE VENTED OPENINGS-PHASE 1,
AD-434 222 DIV. 13

SHIELDING
HYDROGEN
DEPENDENCE OF NEUTRON ALBEDOS UPON HYDROGEN CONTENT OF A SHIELD,
AD-433 735 DIV. 20

SHIP HULLS
HYDRODYNAMIC CONFIGURATIONS
EFFECTS OF LONGITUDINAL BOTTOM SPRAY STRIPS ON PLANING BOAT RESISTANCE,
AD-434 142 DIV. 31

SHIP HULLS
LANDING CRAFT
POWERING CHARACTERISTICS OBTAINED WITH VERTICAL AXIS PROPELLERS FOR LUC(A) REPRESENTED BY MODEL 4952-1,
AD-434 291 DIV. 31
RESISTANCE CHARACTERISTICS OBTAINED WITH VERTICAL AXIS PROPELLERS FOR LCU(A) REPRESENTED BY MODEL 4952,
AD-434 703 DIV. 31

SHIP STRUCTURAL COMPONENTS
VIBRATION
COLLECTION OF REPORTS ON VIBRATION SURVEYS,
AD-434 328 DIV. 31

SHIPS
MOTION
THE ANALYTICAL PREDICTION OF SHIP PERFORMANCE IN RANDOM SEAS, INCLUDING A NEW CORRELATION OF THEORETICAL AND EXPERIMENTAL MODEL MOTIONS IN REGULAR WAVES,
AD-434 563 DIV. 9

SHIPS (NONMILITARY)
PROPULSION
POWER PREDICTIONS FOR A VEHICLE CARGO SHIP (T-LSV-RO/RO) REPRESENTED BY MODEL 4937,
AD-433 952 DIV. 9

SHIPS (NONMILITARY)
ROLL
APPLICATION OF LINEAR SUPERPOSITIC TECHNIQUES TO THE ROLL RESPONSE OF A SHIP MODEL IN IRREGU- LAR BEAM SEAS,
AD-433 793 DIV. 9

SHIPS (NON-MILITARY)
ROLL
EFFECT OF SPEED AND WAVE HEIGHT ON THE ROLLING OF A SHIP MODEL WITH PASSIVE ANTI-ROLLING TANKS,
AD-433 738 DIV. 9

SHOCK TUBES
ASTROPHYSICS
RESEARCH DIRECTED TOWARD THEORETICAL AND EXPERIMENTAL INVESTIGATIONS IN LABORATORY ASTROPHYSICS INVOLVING SHOCK HEATED HIGH TEMPERA- TURE GASES,
AD-434 357 DIV. 30

SHOCK TUBES
DESIGN
SHOCK TUBE SPECTROSCOPY LABORATORY
AD-433 547 DIV. 25

SHOCK TUBES
TEMPERATURE
TEMPERATURE MEASUREMENTS FOR SHOCK HEATED POWDERED SOLIDS,
AD-433 550 DIV. 30

SHOCK TUBES
TESTS
A STUDY OF RADIATION INDUCED SHOCK WAVES EXTERNAL TO QUARTZ DISCHARGE TUBES AND ASSOCIATED FRACTURE PROBLEMS,
AD-434 325 DIV. 25

SHOCK WAVES
AIR
CHARTS OF NORMAL SHOCK WAVE PROPERTIES IN IMPERFECT AIR,
AD-433 958 DIV. 25

SHOCK WAVES
MEASUREMENT
A STUDY OF RADIATION INDUCED SHOCK WAVES EXTERNAL TO QUARTZ DISCHARGE TUBES AND ASSOCIATED FRACTURE PROBLEMS,
AD-434 325 DIV. 25

SHOCK (MECHANICS)
GUIDED MISSILES
SHOCK, VIBRATION AND ASSOCIATED ENVIRONMENTS, PART IV,
AD-433 726 DIV. 12

SIGNAL-TO-NOISE RATIO
AMPLIFIERS
OPTIMUM NOISE PERFORMANCE OF MULTITERMINAL AMPLIFIERS,
AD-434 781 DIV. 8

SILICON
DIFFUSION
INVESTIGATION OF DIFFUSION OF SILICON IN CERTAIN TRANSITIONAL METALS,
AD-434 940 DIV. 17
WEBBED DENDRITIC SILICON SOLAR CELL RADIATION EFFECTS INVESTIGATION,
AD-434 706 DIV. 7

SILICON COATINGS
TRANSITION ELEMENTS
INVESTIGATION OF DIFFUSION OF SILICON IN CERTAIN TRANSITIONAL METALS,
AD-434 940 DIV. 17

SILVER
RECOVERY
SILVER RECOVERY SYSTEM,
AD-434 471 DIV. 4A

SILVER
SURFACES
THE EFFECT OF DISLOCATIONS AND ORIENTATION UPON THE ELECTRICAL DOUBLE LAYER CAPACITY OF SILVER SURFACES, PART I, SUPPLEMENT TO FINAL REPORT OF MARCH 1, 1963: THE EFFECT OF SURFACE PREPA- RATION AND DISLOCATIONS ON THE SILVER CATALYZED DECOMPOSITION OF FORMIC ACID,
AD-434 716 DIV. 25

SIMULATION
METEOROLOGY
A STUDY TO IMPROVE THE LOW-LEVEL METEOROLOGICAL SIMULATOR,
AD-433 777 DIV. 2

SIMULTANEOUS EQUATIONS
MATRIX ALGEBRA
MULTIVARIATE SPECTRAL THEORY, PART II THE LINKED EIGENVALUE PROBLEM FOR MATRICES,
AD-433 943 DIV. 18

SINGLE CRYSTAL
MEASUREMENT
SINGLE CRYSTAL ORIENTER SETTINGS (CDC 1604),
AD-434 156 DIV. 25

SINGLE CRYSTALS
ALLOYS
AN INVESTIGATION OF INTERDIFFUSIO IN METALLIC SINGLE CRYSTALS,
AD-433 509 DIV. 25

SINGLE CRYSTALS
FLUORIDES
AN EXPERIMENTAL STUDY OF THE EFFECT OF AN ELECTRIC FIELD ON THE SHARP GREEN FLUORESCENCE TRANSITIONS OF E R IV IN SINGLE CRYSTALLINE FLUORITE,
AD-434 795 DIV. 25

SINGLE CRYSTALS
MOLYBDENUM
MECHANICAL PROPERTIES AND TEMPERATURE OF RECRYSTALLIZATION OF SINGLE CRYSTALS OF MOLYBDENUM,
AD-434 969 DIV. 17

SIPHONAPTERA
COLLECTING METHODS
ECOLOGY AND CONTROL OF DISEASE VECTORS AND RESERVOIRS,
AD-435 045 DIV. 14

SKIN
PERMEABILITY
BASIC STUDIES IN PERCUTANEOUS ABSORPTION,
AD-434 459 DIV. 14

SLOT ANTENNAS
DESIGN
RESEARCH ON LOG-PERIODIC ARRAYS OF SLOTS,
AD-434 190 DIV. 8

SNOW
POLAR REGIONS
SNOW COMPACTION IN ANTARCTICA-ROADS ON SNOW-COVERED SEA ICE,
AD-434 118 DIV. 13

SOCCOMETRICS
GROUP DYNAMICS
AN INVESTIGATIO OF THE PRODUCT MOMENT INTERCORRELATIONS AONG SMALL GROUP LEADERSHIP CRITERIA,
AD-434 865 DIV. 26

SOCIAL SCIENCE
BIBLIOGRAPHIES
BIBLIOGRAPHY OF VIET-NAM,
AD-433 783 DIV. 32

SOCIOLOGY
ENGINEERING
SOCIAL VALUE AND TECHNOLOGICAL DESIGN,
AD-433 512 DIV. 32

SOCIOMETRICS
GROUP DYNAMICS
PREDICTABILITY OF SMALL GROUP LEADERSHIP CRITERIA,
AD-434 864 DIV. 26

SODIUM
EXCRETION
ISOLATION, IDENTIFICATION AND PHYSIOLOGY OF A POSTULATED HORMONE CAPABLE OF INDUCING EXCRETION OF SODIUM,
AD-433 770 DIV. 16

SOIL MECHANICS
SHEAR STRESS MEASUREMENTS IN SITU OF SOILS SUBJECTED TO VIBRATORY LOADS,
AD-433 800 DIV. 25

SOILS
VIBRATION
SHEAR STRESS MEASUREMENTS IN SITU OF SOILS SUBJECTED TO VIBRATORY LOADS,
AD-433 800 DIV. 25

SOLAR CELLS
RADIATION DAMAGE
WEBBED DENDRITIC SILICON SOLAR CELL RADIATION EFFECTS INVESTIGATION,
AD-434 706 DIV. 7

SOLAR DISTURBANCES
CLASSIFICATION
CLASSIFICATION OF SOLAR PROMINENCE FOR SUNSPOT CYCLE NO. 19 - 1961,
AD-434 154 DIV. 2

SOLAR FLARES
MEASUREMENT
ON THE CENTER-LIMB EFFECT OF SOLAR FLARE AREA,
AD-433 787 DIV. 2

SOLAR FLARES
SPECTROPHOTOMETERS
SPECTROPHOTOMETRIC OBSERVATIONS OF SOLAR FLARES (PART I), RESULTS FROM THE VISUAL OBSERVATION OF SOLAR ACTIVITY (PART II),
AD-433 788 DIV. 2

SOLAR FLARES
STATISTICAL ANALYSIS
STATISTICS OF SOLAR FLARES,
AD-433 789 DIV. 2

SOLAR RADIATION
ATMOSPHERE
EXPERIMENTAL RESEARCHES OF SPECTRAL TRANSPARENCY OF ATMOSPHERE,
AD-434 949 DIV. 2

SOLAR SPECTRUM
GASES
SOLAR RESEARCH AND DEVELOPMENT ACTIVITIES AT SACRAMENTO PEAK OBSERVATORY,
AD-433 974 DIV. 2

SOLAR SPECTRUM
MEASUREMENT
EXPERIMENTAL RESEARCHES OF SPECTRAL TRANSPARENCY OF ATMOSPHERE,
AD-434 949 DIV. 2

SOLID ROCKET PROPELLANT BINDERS
MECHANICAL PROPERTIES
EFFECT OF FILLER CONCENTRATION ON THE VISCOELAS- TIC RESPONSE OF A COMPOSITE SOLID PROPELLANT,
AD-433 612 DIV. 10

SOLID ROCKET PROPELLANTS
SOLID ROCKET PROPELLANT BINDERS
EFFECT OF FILLER CONCENTRATION ON THE VISCOELAS- TIC RESPONSE OF A COMPOSITE SOLID PROPELLANT,
AD-433 612 DIV. 10

SOLID ROCKET PROPELLANTS
THERMAL DIFFUSION
ENGINEERING RESEARCH,
AD-433 635 DIV. 10

SOLID STATE PHYSICS
ABSTRACTS
ELECTRON AND SOLID STATE PHYSICS RESEARCH,
AD-434 911 DIV. 25
DIVISION 4, SOLID STATE RESEARCH,
AD-435 023 DIV. 25

SOLIDS
BANDWIDTH
FREQUENCY RESPONSE OF NON-LINEAR VISCOELASTIC SOLIDS,
AD-434 682 DIV. 25

SOLIDS
MECHANICAL PROPERTIES
METHOD OF DETERMINING DYNAMIC PROPERTIES OF VISCO-ELASTIC SOLIDS EMPLOYING FORCED VIBRATION,
AD-434 085 DIV. 25

SOLIDS
SEMICONDUCTORS
SOLID-STATE MICROWAVE RESEARCH,
AD-434 196 DIV. 9

SOLIDS
ULTRASONIC RADIATION
DISTORTION OF FORM OF ULTRASONIC WAVE OF FINITE AMPLITUDE IN SOLIDS,
AD-434 951 DIV. 25

SOLIDS
VACUUM APPARATUS
STUDY OF ADSORPTION OF GASES ON SOLIDS IN THE HIGH VACUUM RANGE,
AD-434 094 DIV. 25

SOUND
PROPAGATION
DISTORTION OF FORM OF ULTRASONIC WAVE OF FINITE AMPLITUDE IN SOLIDS,
AD-434 951 DIV. 25

SOUND TRANSMISSION
PROGRAMMING (COMPUTERS)
FORTRAN PROGRAM FOR ENERGY RATIOS OF REFLECTED AND REFRACTED WAVES AT FLAT BOUNDARIES,
AD-433 810 DIV. 25

SOUNDING ROCKETS
PERFORMANCE (ENGINEERING)
HASP, INSTRUMENTED, RELEASE TO PROTOTYPE PRODUCTION FOR EVALUATION OF THE HEADS, 1.625INCH, ROCKET, MK 1 MOD 0 AND MK 2 MOD 0,
AD-433 567 DIV. 22

SPACE CAPSULES
MODEL TESTS
DYNAMICS OF SEPARATING BODIES, VOLUME III, MEASUREMENTS AT MACH 8,
AD-433 542 DIV. 9

SPACE CAPSULES
TELEMETER DATA
TITAN, SCIENTIFIC PASSENGER POD ADDENDUM TO ANNEX FLIGHT TEST DIRECTIVE MISSILE N-33, XSM 688 WS-107A-2 PROGRAM,
AD-434 336 DIV. 12

SPACE COMMUNICATION SYSTEMS
MULTIPATH TRANSMISSION
SCATTER COMMUNICATION MODELS FOR SPACE VEHICLES,
AD-433 717 DIV. 5

SPACE COMMUNICATION SYSTEMS
PARABOLIC ANTENNAS
RESEARCH AND EXPERIMENTATION ON SPACE APPLICATIONS OF MILLIMETER WAVES,
AD-434 543 DIV. 8

SPACE COMMUNICATIONS SYSTEMS
RESEARCH PROGRAM ADMINISTRATION
DIVISION 6, SPACE COMMUNICATIONS,
AD-433 602 DIV. 5

SPACE ENVIRONMENTAL CONDITIONS
GUIDED MISSILES
SOME EFFECTS OF THE NATURAL ENVIRONMENT ON AERO- SPACE SYSTEMS,
AD-434 324 DIV. 12

SPACE ENVIRONMENTAL CONDITIONS
TEST FACILITIES
THEORETICAL AND EXPERIMENTAL STUDY TO DETERMINE OUTGASSING CHARACTERISTICS OF VARIOUS MATERIALS,
AD-433 484 DIV. 14

SPACE FLIGHT
ROCKET PROPULSION
BEFORE THE SIGNAL LIFT OFF SOUNDS,
AD-434 971 DIV. 12

SPACE SURVEILLANCE SYSTEMS
INSTRUMENTATION
CALIBRATION OF DOPPLER SATELLITE OBSERVATIONS BY SHORT ARC SOLUTION FOR STATION COORDINATES,
AD-435 978 DIV. 12

SPACECRAFT
ATMOSPHERE ENTRY
SPACE SHIP RETURNS TO EARTH,
AD-434 991 DIV. 12

SPACECRAFT
BATTERIES + COMPONENTS
LITHIUM ANODE LIMITED CYCLE SECONDARY BATTERY,
AD-433 543 DIV. 7

SPACECRAFT
JETTISONABLE COCKPITS
A BASIC INVESTIGATION OF CONTROLLABLE THRUST DEVICES FOR ESCAPE FROM ADVANCED FLIGHT VEHICLES, PHASE II, PART 1, OPERATION UP TO 4000 MILES, PART 2, COMPUTER STUDY AND EXPERIMENTAL PROGRAM,
AD-434 289 DIV. 27

SPARKS
ELECTRIC DISCHARGES
IMPULSE STREAMER BRANCHING FROM LICHTENBERG FIGURE STUDIES,
AD-434 257 DIV. 25A

SPECIAL FUNCTIONS (MATHEMATICAL)
LINEAR SYSTEMS
GENERATION OF QUADRATIC-TYPE LIAPUNOV FUNCTIONS FOR LINEAR TIME-VARYING SYSTEMS,
AD-433 982 DIV. 15

SPECIAL FUNCTIONS (MATHEMATICAL)
TABLES
EVALUATION OF COMPLEX ORDER HANKEL FUNCTIONS,
AD-434 113 DIV. 15

SPECIAL PURPOSE COMPUTERS
BOILERS
DEVELOPMENT AND EVALUATION OF A BOILER EFFICIENCY COMPUTING AND INDICATING SYSTEM,
AD-433 968 DIV. 30

SPECIFICATIONS
PROCESSING
PEM FOR TRANSISTOR MANUFACTURING PROCESS IMPROVEMENT,
AD-433 654 DIV. 8

SPECTROSCOPY
FLUORESCENCE
AN EXPERIMENTAL STUDY OF THE EFFECT OF AN ELECTRIC FIELD ON THE SHARP GREEN FLUORESCENCE TRANSITIONS OF E R IV IN SINGLE CRYSTALLINE FLUORITE,
AD-434 795 DIV. 25

SPECTRUM ANALYZERS
CONSTRUCTION
CONSTRUCTION AND CALIBRATION OF AN ANTI-COMPTON SPECTROMETER,
AD-434 765 DIV. 25

SPECTRUM ANALYZERS
RECORDING SYSTEMS
DIRECT RECORDING OF INTEGRATED BAND INTENSITIES FROM A LINEAR WAVELENGTH SPECTROMETER,
AD-433 598 DIV. 25

SPECTRUM ANALYZERS
SOLAR FLARES
PRELIMINARY MEASUREMENT OF H-ALPHA FLARE SPECTROGRAMS,
AD-433 786 DIV. 2

SPHERES
HYPERSONIC FLOW
DETERMINING THE AERODYNAMIC FORCES ACTING ON BODIES WITH FRONTAL DISRUPTION ZONE IN HYPERSONIC FLOWS,
AD-433 538 DIV. 9

SPHERES
UNDERWATER EXPLOSIONS
RESPONSE OF SUBMERGED SPHERICAL SHELLS TO INTERNAL BLAST LOADING,
AD-434 702 DIV. 22

SPLICING TOOLS
ELECTRIC CABLES
REFINEMENT + MANUFACTURE TOOL AND SPLICE FOR TELEPHONE CABLE WF-16 ( ) / U,
AD-434 909 DIV. 7

STABILITY
THEORY
ON THE POSTULATE OF STABILITY OF MATERIAL IN THE MECHANICS OF CONTINUA,
AD-435 076 DIV. 13

STABILIZATION SYSTEMS
DESIGN
OLS STABILIZATION EQUIPMENT MODEL 36H2 OPERATING INSTRUCTION MANUAL,
AD-435 055 DIV. 30

STAPHYLOCOCCUS
DISEASE VECTORS
BIONOMICS OF THE STAPHYLOCOCCUS IN THE NASAL CARRIER,
AD-434 268 DIV. 16

STARVATION
CARDIOVASCULAR SYSTEM
CARDIOVASCULAR EFFECTS OF REFEEDING STRESS FOLLOWING STARVATION, XII, CONTINUATION OF LONG- TERM STARVATION AND REFEEDING EPISODES, FINAL EPISODES AND POST MORTEM RESULTS,
AD-434 116 DIV. 16

STATISTICAL DISTRIBUTIONS
STATISTICAL FUNCTIONS
ON THE ASYMPTOTIC JOINT NORMALITY OF QUANTILES FROM A MULTIVARIATE DISTRIBUTION,
AD-433 877 DIV. 15

STATISTICAL FUNCTIONS
MATHEMATICAL ANALYSIS
THE STRUCTURE OF THE SOLUTION SET FOR A GENERAL- IZED REDUCED HAUSDORFF MOMENT PROBLEM,
AD-433 876 DIV. 15

STATISTICAL FUNCTIONS
STATISTICAL DISTRIBUTIONS
ON THE ASYMPTOTIC JOINT NORMALITY OF QUANTILES FROM A MULTIVARIATE DISTRIBUTION,
AD-433 877 DIV. 15

STATISTICAL FUNCTIONS
STATISTICAL PROCESSES
THE CONVERGENCE OF A RANDOM DISTRIBUTION FUNCTION ASSOCIATED WITH A BRANCHING PROCESS,
AD-434 059 DIV. 15

STATISTICAL MECHANICS
QUANTUM MECHANICS
THE MICROCANONICAL ENSEMBLE,
AD-433 834 DIV. 25

STATISTICAL PROCESSES
ECONOMICS
TECHNIQUES FOR ECONOMIC CONTROL CHART OPERATION,
AD-433 648 DIV. 32

STATISTICAL TESTS
STATISTICAL FUNCTIONS
PERCENTILE MODIFICATIONS OF TWO SAMPLE RANK TESTS,
AD-433 869 DIV. 15

STEEL
CORROSION
DISSOLUTION RATES OF ZONE REFINED IRON AND STEEL IN HCL, H2SO4 AND NACL AQUEOUS SOLUTIONS,
AD-434 230 DIV. 4

STEEL
CREEP
CREEP OF STEEL OF VARIOUS ALLOYING DEGREES,
AD-433 583 DIV. 17

STEEL
DUCTILITY
PLASTIC DESIGN IN HIGH STRENGTH STEEL,
AD-434 271 DIV. 13

STEEL
FRACTOGRAPHY
SOME OBSERVATIONS ON THE ELECTRON-MICROSCOPIC FRACTOGRAPHY OF EMBRITTLED STEELS,
AD-434 987 DIV. 17

STEEL
FRACTURE (MECHANICS)
THE INVESTIGATION OF STRESS CORROSION CRACKING OF HIGH STRENGTH STEELS,
AD-434 247 DIV. 17

STEEL
GAMMA RAYS
SOMME GAMMA-RAY SHIELDING PROPERTIES OF FINITE STEEL SLABS,
AD-433 658 DIV. 17
DEVELOPMENT OF HIGH INTEGRITY CLOSE TOLERANCE HIGH STRENGTH AIRCRAFT QUALITY STEEL CASTINGS,
AD-434 383 DIV. 17

STEEL
NON-DESTRUCTIVE TESTING
INVESTIGATION OF HALL-EFFECT DEVICES FOR FLAW DETECTION IN METALS,
AD-433 895 DIV. 30

STOCHASTIC PROCESSES
MATHEMATICAL PREDICTIONS
SOME OBSERVATIONS ON MEASURABLE PROPERTIES OF RANDOM PROCESSES AND FIELDS, I,
AD-434 120 DIV. 15

STOCHASTIC PROCESSES
PARTIAL DIFFERENTIAL EQUATIONS
ON THE PARTIAL DIFFERENTIAL EQUATION FOR THE CON- DITIONAL PROBABILITY DISTRIBUTION FOR NONLINEAR DYNAMIC SYSTEMS WITH NOISY MEASUREMENTS,
AD-434 872 DIV. 15

STOCHASTIC PROCESSES
WARFARE
THE DISTRIBUTION OF ROUNDS FIRED IN STOCHASTIC DUELS
AD-433 769 DIV. 18

STOMACH
ELECTRIC POTENTIAL
IONIC RELATIONSHIPS OF THE BIOELECTROGENIC MECHANISM IN ISOLATED RAT STOMACH,
AD-433 809 DIV. 16

STORAGE TUBES
MANUFACTURING METHODS
PRODUCTION ENGINEERING MEASURE FOR TYPE FW-202 BARRIER GRID STORAGE TUBE.
AD-434 067 DIV. 8
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION PROJECT NO. R-55,
AD-433 911 DIV. 2

STRESS (PHYSIOLOGY)
ASTRONAUTS
OVERLOADING AND WAY OF INCREASE OF ENDURANCE OF ORGANISM,
AD-434 948 DIV. 16

STRESS (PHYSIOLOGY)
STARVATION
CARDIOVASCULAR EFFECTS OF REFEEDING STRESS FOLLOWING STARVATION. XIII. CONTINUATION OF LONG- TERM STARVATION AND REFEEDING EPISODES, FINAL EPISODES AND POST MORTEM RESULTS,
AD-434 116 DIV. 16

STRESSES
CORROSION
THE INVESTIGATION OF STRESS CORROSION CRACKING OF HIGH STRENGTH STEELS,
AD-434 247 DIV. 17
BEHAVIOR OF TITANIUM ALLOYS DURING CORROSION UNDER STRESS IN ACID MEDIA,
AD-434 297 DIV. 17

STRESSES
MATHEMATICAL ANALYSIS
A RAPID METHOD FOR ESTIMATING THE GREATEST STRESS IN A STRUCTURE SUBJECT TO CREEP,
AD-435 077 DIV. 13

STRESSES
NIOBIUM
THE EFFECT OF STRESS ON THE LUDERS BAND VELOCITY IN NIOBIUM,
AD-434 098 DIV. 17

STRESSES
NUMERICAL ANALYSIS
STRESSES IN A PERFORATED CYLINDRICAL SHELL,
AD-434 560 DIV. 28

STRESSES
TOPOLOGY
REPRESENTATION THEOREMS IN THE MECHANICS OF MATERIALS WITH MEMORY,
AD-434 704 DIV. 28

STROBOSCOPES
MAGNETO-OPTIC EFFECT
FOUNDATIONAL RESEARCH PROJECTS OCTOBER-DECEMBER 1963,
AD-433 998 DIV. 8

STRUCTURAL PARTS
STEEL
FURTHER STUDIES OF THE MOMENT-THRUST-CURVATURE RELATIONSHIP,
AD-434 754 DIV. 13

STRUCTURAL PROPERTIES
MATHEMATICAL ANALYSIS
FURTHER STUDIES OF THE MOMENT-THRUST-CURVATURE RELATIONSHIP,
AD-434 754 DIV. 13

STRUCTURAL PROPERTIES
STRESSES
THE STRUCTURE AND STRENGTH OF EPITAXIAL FILMS,
AD-434 805 DIV. 25

STRUCTURAL SHELLS
BUCKLING (MECHANICS)
BUCKLING OF ISOTROPIC, ORTHOTROPIC AND RING-STIFFENED CONICAL SHELLS,
AD-434 345 DIV. 28

STRUCTURAL SHELLS
MATRIX ALGEBRA
INVESTIGATION OF PLATE AND SHELL MODELS BY MATRICES,
AD-434 846 DIV. 13

STRUCTURAL SHELLS
STRESSES
LARGE AMPLITUDE VIBRATION AND RESPONSE OF CURVED PANELS,
AD-433 885 DIV. 12
STRESSES IN A PERFORATED CYLINDRICAL SHELL,
AD-434 560 DIV. 28

STRUCTURAL SHELLS
UNDERWATER EXPLOSIONS
RESPONSE OF SUBMERGED SPHERICAL SHELLS TO INTERNAL BLAST LOADING,
AD-434 702 DIV. 28

STRUCTURAL SHELLS
VIBRATION
FORCED VIBRATIONS OF A VISCO-ELASTIC CYLINDER CASE-BONDED TO A THIN ELASTIC SHELL,
AD-434 192 DIV. 28

STRUCTURES
CREEP
A RAPID METHOD FOR ESTIMATING THE GREATEST STRESS IN A STRUCTURE SUBJECT TO CREEP,
AD-435 077 DIV. 13

STRUCTURES
FOUNDATIONS
A STUDY OF THE DESIGN AND ANALYSIS OF FOUNDATIONS,
AD-433 965 DIV. 13

SUBMARINES
CONFINED ENVIRONMENTS
SUBMARINE ATMOSPHERE STUDIES ABOARD USS SCULPIN,
AD-433 996 DIV. 31

SUBMARINES
PROPELLERS
CAVITATION PERFORMANCE OF PROPELLERS IN A SUBMARINE WAKE,
AD-434 185 DIV. 31

SULFUR COMPOUNDS
FLUORIDES
THE MASS AND MICROWAVE SPECTRA, STRUCTURES AND DIPOLE MOMENTS OF THE ISOMERS OF SULFURMONO-FLUORIDE,
AD-434 344 DIV. 25
OBSERVATIONS OF THE OWENS VALLEY RADIO OBSERVA- TORY, 2, DIRECTION OF THE GALACTIC MAGNETIC FIELD IN THE VICINITY OF THE SUN,
AD-434 040 DIV. 2

SUNSPOTS
ANALYSIS
CLASSIFICATION OF SOLAR PROMINENCE FOR SUNSPOT CYCLE NO. 19 - 1961,
AD-434 154 DIV. 2

SUNSPOTS
CLASSIFICATION
CLASSIFICATION OF SOLAR PROMINENCE FOR SUNSPOT CYCLE NO. 19 - 1960,
AD-434 153 DIV. 2

SUPERCONDUCTIVITY
SCIENTIFIC RESEARCH
SUPERCONDUCTIVITY,
AD-433 718 DIV. 25

SUPERHIGH FREQUENCY
CRYSTALS
HIGH PRECISION MINIATURE CRYSTAL UNITS 4.3 TO 20 MC,
AD-433 708 DIV. 8

SUPERSONIC FLOW
BLUNT BODIES
AN ITERATIVE METHOD FOR APPROXIMATING THE FLOW FIELD ABOUT A SUPERSONIC BLUNT BODY,
AD-433 078 DIV. 9

SUPERSONIC FLOW
ONE-DIMENSIONAL FLOW
CONCERNING CERTAIN PECULIARITIES OF AVERAGING OF PARAMETERS IN A SUPERSONIC GAS FLOW,
AD-434 965 DIV. 9

SUPERSONIC FLOW
SEPARATION
BASE PRESSURE BEHIND TWO-DIMENSIONAL AND AXIALLY SYMMETRIC BACKWARD FACING STEPS IN A TURBULENT SUPERSONIC FLOW,
AD-434 823 DIV. 9

SUPERSONIC NOZZLES
CONFIGURATION
SUPERSONIC EXPIRATION OF GAS OUT OF ASYMMETRIC VESSEL OF FINITE WIDTH DURING MAXIMUM EXPENDITURE,
AD-434 947 DIV. 27

SURFACE ACTIVE SUBSTANCES
COATINGS
HYDROPHOBIC AND OLEOPHOBIC FLUOROPOLYMER COATINGS OF EXTREMELY LOW SURFACE ENERGY,
AD-434 213 DIV. 14

SURFACE ACTIVE SUBSTANCES
MONOMOLECULAR FILMS
A FORCE-AREA STUDY OF MIXED FILMS OF TRYPSIN AND OVOMUCOID,
AD-433 674 DIV. 16

SURFACE TEMPERATURES
DISTRIBUTION
PROBABLE INTERFACE TEMPERATURES OF SOLIDS IN SLIDING CONTACT,
AD-433 587 DIV. 25

SURFACE TEMPERATURES
FRICTION
INSTANTANEOUS TEMPERATURES ON CONTACT SURFACES DUE TO FRICTION,
AD-434 549 DIV. 25

SURFACES
IMPURITIES
NEW METHODS OF APPRAISAL OF SURFACE PURITY,
AD-434 982 DIV. 26

SURFACES
SILVER
THE EFFECT OF DISLOCATIONS AND ORIENTATION UPON THE ELECTRICAL DOUBLE LAYER CAPACITY OF SILVER SURFACES. PART I. SUPPLEMENT TO FINAL REPORT OF MARCH 1, 1963: THE EFFECT OF SURFACE PREPA- RATION AND DISLOCATIONS ON THE SILVER CATALYZED DECOMPOSITION OF FORMIC ACID,
AD-434 716 DIV. 25

SWAMPS
ENGINEERING
A REVIEW OF MUSKEG AND ITS ASSOCIATED ENGINEERING PROBLEMS,
AD-434 077 DIV. 13

SWITCHING CIRCUITS
MICROMINIATURIZATION (ELECTRONICS)
FUNCTIONAL CIRCUIT UNITS,
AD-433 711 DIV. 8

SWITCHING CIRCUITS
NON-LINEAR SYSTEMS
A FORMAL THEORY OF GENERALIZED MULTIPLE-OUTPUT BINARY COMBINATIONAL SWITCHING NETWORKS,
AD-434 734 DIV. 8

SYMPOSIA
BATTERIES + COMPONENTS
SIXTH SYMPOSIUM ON AMMONIA BATTERIES AT UNIVERSITY OF CALIFORNIA, BERKELEY, CALIFORNIA, JANUARY 30-31, 1964,
AD-433 973 DIV. 7
SIXTH SYMPOSIUM OF AMMONIA BATTERIES AT UNIVER- SITY OF CALIFORNIA, BERKELEY, CALIFORNIA, JANUARY 30-31, 1964, (SUPPLEMENT),
AD-434 022 DIV. 7

SYMPOSIA
MACHINE TRANSLATION
U. S.-JAPAN SEMINAR ON MECHANICAL TRANSLATION SUMMARY OF U. S. CONTRIBUTIONS,
AD-433 850 DIV. 30

SYMPOSIA
WOOD
PROCEEDINGS OF THE SYMPOSIUM ON NONDESTRUCTIVE TESTING OF WOOD,
AD-434 815 DIV. 14

SYNTHESIS
LINEAR SYSTEMS
SOME QUESTIONS ABOUT THE STATISTICAL DYNAMICS OF AUTOMATIC REGULATION SYSTEMS,
AD-433 524 DIV. 15

TABLES
ATOMIC ORBITALS
GENERALIZED TABLES FOR THE CALCULATION OF DIPOLE TRANSITION PROBABILITIES IN LS -COUPLING,
AD-434 151 DIV. 25

TABLES
THERMODYNAMICS
TABLES OF THERMODYNAMIC PROPERTIES OF ARGON FROM 100 TO 3000 K,
AD-434 368 DIV. 25

TANTALUM CAPACITORS
MANUFACTURING METHODS
PRODUCTION ENGINEERING MEASURE FOR IMPROVED RELIABILITY OF SOLID ELECTROLYTE TANTALUM CAPACITORS,
AD-433 805 DIV. 8

TANTALUM CAPACITORS
PRODUCTION
PRODUCTION ENGINEERING MEASURE FOR IMPROVED RELIABILITY OF SOLID TANTALUM ELECTROLYTIC CAPACITORS,
AD-434 322 DIV. 8

TARGET DRONES
PERFORMANCE (ENGINEERING)
EVALUATION OF THE COMPATIBILITY OF THE AQM-37A TARGET, LAU-24/A LAUNCHER, AND A-4B LAUNCH AIRCRAFT,
AD-433 591 DIV. 22

TEACHING MACHINES
LEARNING
SOME EDUCATIONAL PROBLEMS AND PROSPECTS OF A SYSTEMS APPROACH TO INSTRUCTION,
AD-433 032 DIV. 29

TEACHING MACHINES
MATHEMATICS
A PLATO PROGRAM FOR INSTRUCTION AND DATA COLLECTION IN MATHEMATICAL PROBLEM SOLVING,
AD-434 249 DIV. 30

TEETH
MOTION
HORIZONTAL TOOTH MOBILITY IN CAREFULLY SCREENED SUBJECTS,
AD-434 871 DIV. 14

TELEMETER DATA
SPACE CAPSULES
TITAN, SCIENTIFIC PASSENGER POD ADDENDUM TO ANNEX FLIGHT TEST DIRECTIVE MISSILE N-33, XSM 608 WS-107A-2 PROGRAM.
AD-434 336 DIV. 18

TELEVISION EQUIPMENT
X RAYS
NONDESTRUCTIVE SYSTEM FOR INSPECTION OF FIBER GLASS REINFORCED PLASTIC MISSILE CASES AND OTHER STRUCTURAL MATERIALS.
AD-434 819 DIV. 8

TELLURIDES
LANTHANUM COMPOUNDS
TELLURIDES OF LANTHANUM.
AD-434 972 DIV. 4

TEMPERATURE
ATOMIC SPECTROSCOPY
TEMPERATURE MEASUREMENTS FOR SHOCK HEATED POWDERED SOLIDS.
AD-433 550 DIV. 30

TENSILE PROPERTIES
ANISOTROPY
ANISOTROPY OF TITANIUM SHEET IN UNIAXIAL TENSION.
AD-433 722 DIV. 17

TERRAIN AVOIDANCE
AIRCRAFT
HUMAN TRACKING ABILITY FOR MAXIMUM TERRAIN FOLLOWING.
AD-435 022 DIV. 19

TERRESTRIAL MAGNETISM
TABLES
MAGNETOMETER, PHOTOMETER, AND EARTH OBSERVATIONS AT KIRUNA.
AD-434 778 DIV. 2

TEST EQUIPMENT (ELECTRONICS)
RADIOFREQUENCY INTERFERENCE
DEVELOPMENT OF STANDARD CALIBRATI(PROCEDURE FOR INTERFERENCE MEASURING INSTRUMENTS.
AD-435 073 DIV. 30

TEST SETS
RADIO INTERFERENCE
RADIO INTERFERENCE MEASURING SET AN/URM-100 (XE-1).
AD-434 979 DIV. 30

THALLIUM
PHYSICAL PROPERTIES
PROPERTIES OF SOLUTIONS OF METALS IN MOLTEN SALTS.
AD-434 538 DIV. 4

THERMAL CONDUCTIVITY
BOUNDARY LAYER
HEAT CONDUCTION IN A TWO-LAYER SYSTEM.
AD-433 536 DIV. 25

THERMAL RADIATION
EYE
EFFECTS OF THERMAL ENERGY ON RETINAL FUNCTION.
AD-434 726 DIV. 14

THERMIONIC CONVERTERS
DIODES
KRYPTON FILLED THERMIONIC COVERTER.
AD-434 087 DIV. 7

THERMIONIC CONVERTERS
MATERIALS
PERMEATION OF HYDROGEN THROUGH METALS IN THER- MIONIC-CONVERTER APPLICATIONS.
AD-434 873 DIV. 7

THERMIONIC CONVERTERS
SCIENTIFIC RESEARCH
RESEARCH STUDIES ON THERMIONIC CONVERTERS, EMIT- TER SHELL PHASE.
AD-434 908 DIV. 8

THERMIONIC EMISSION
METALS
PERMEATION OF HYDROGEN THROUGH METALS IN THER- MIONIC-CONVERTER APPLICATIONS.
AD-434 873 DIV. 7

THERMIONIC EMISSION
PLASMA PHYSICS
THE ROLE OF ALUMINUM AND ITS OXIDES AS SOURCES OR MODERATORS OF ELECTRONS IN SOLID PROPELLANT ROCKET EXHAUSTS.
AD-434 699 DIV. 25

THERMODYNAMICS
ARGON
TABLES OF THERMODYNAMIC PROPERTIES OF ARGON FROM 100 TO 3000 K.
AD-434 368 DIV. 25

THERMODYNAMICS
MATHEMATICAL ANALYSIS
THERMODYNAMICS OF ORDER-DISORDER PHENOMENA.
AD-434 387 DIV. 25

THERMODYNAMICS
OXIDES
INVESTIGATION OF THE SURFACE OPTICAL PROPERTIES OF OXIDES AS A FUNCTION OF COMPOSITION.
AD-434 372 DIV. 25

THERMOELECTRICITY
MEASUREMENT
SYSTEM FOR MEASURING SEEBECK COEFFICIENT AND RESISTIVITY.
AD-433 673 DIV. 30

THIN FILMS
EPITAXIAL GROWTH
VACUUM EVAPORATED AND CATHODIC SPUTTERED THIN FILMS.
AD-433 828 DIV. 25

THIN FILMS
OXIDATION
STUDY OF COMPREHENSIVE FAILURE THEORY.
AD-434 794 DIV. 8
SYNTHESIS OF POTENTIAL ANTIRADIATION DRUGS.
AD-434 058 DIV. 4

THRUST BEARINGS
GAS BEARINGS
GROOVED PLATE GAS LUBRICATED THRUST BEARINGS, WITH SPECIAL REFERENCE TO THE SPIRAL GROOVE BEARING.
AD-434 437 DIV. 24

THRUST VECTOR CONTROL SYSTEMS
SECONDARY INJECTION
LINEAR PROPORTIONAL CONTROL HOT GAS VALVE FOR SECONDARY INJECTION.
AD-433 781 DIV. 27
SUPERSONIC EXPIRATION OF GAS OUT OF ASYMMETRIC VESSEL OF FINITE WIDTH DURING MAXIMUM EXPENDITURE.
AD-434 947 DIV. 27

THUNDERSTORMS
INSTRUMENTATION
INSTRUMENTATION AND OPERATIONS FOR GATHERING THUNDERSTORM DATA WITH AN F-100F AIRCRAFT DURING THE 1963 NATIONAL SEVERE STORM PROJECT.
AD-435 006 DIV. 2

TIN
ELECTRICAL PROPERTIES
TRANSPORT PROPERTIES AND BAND STRUCTURE OF GRAY TIN.
AD-435 042 DIV. 25

TITANIUM
ARC WELDING
AUTOMATIC ELECTRIC ARC WELDING OF TITANIUM.
AD-434 945 DIV. 24

TITANIUM ALLOYS
FRACTURE (MECHANICS)
BEHAVIOR OF TITANIUM ALLOYS DURING CORROSION UNDER STRESS IN ACID MEDIA.
AD-434 997 DIV. 17

TITANIUM ALLOYS
TENSILE PROPERTIES
ANISOTROPY OF TITANIUM SHEET IN UNIAXIAL TENSION.
AD-433 722 DIV. 17

TITANIUM COMPOUNDS
NITRATES
TEMPERATURE STABILITY LIMITS AND DIFFERENTIAL THERMAL ANALYSIS OF CHROMYL NITRATE. SYNTHESIS OF TITANIUM IV COMPOUNDS CONTAINING NITRATE GROUPS.
AD-434 262 DIV. 4

TOPOLOGY
LINEAR SYSTEMS
GENERAL TOPOLOGICAL ANALYSIS OF LINEAR SYSTEMS.
AD-433 495 DIV. 18

TOWED BODIES
FLUID MECHANICS
HEAVING FORCES AND PITCHING MOMENTS ON A SEMISUBMERGED AND RESTRAINED PROLATE SPHEROID PROCEEDING IN REGULAR HEAD WAVES.
AD-433 790 DIV. 9

TOWED BODIES
LIGHTING EQUIPMENT
SERVICE SUITABILITY EVALUATION OF GENERATOR DROUGUE LIGHTING KITS FOR THE D-704 AIR RE-FUELING STORE.
AD-434 025 DIV. 1

TRACERS (ORDNANCE)
FIRING TEST (ORDNANCE)
PRODUCT IMPROVEMENT TEST OF CARTRIDGE, 105-MM, HEP-T, M393A1 (ADAPTION OF TRACER, XM1E1).
AD-434 376 DIV. 22A

TRACKING
ANTENNAS
EXPERIMENTAL RESULTS CONCERNING THE CONICAL SCANNING ERROR SIGNAL OF A BROAD-BAND ANTENNA SYSTEM.
AD-433 489 DIV. 8

TRACKING TELESCOPES
CONTROL SYSTEMS
ANALYSIS OF SERVOMECHANISMS FOR CONTROL OF ELECTRO-OPTICAL SURVEILLANCE TELESCOPES.
AD-433 916 DIV. 6

TRAINING
EXERCISE
OPERATIONS RESEARCH IN PRODUCTION OF SYSTEM TRAINING EXERCISES.
AD-433 840 DIV. 18

TRAINING
PERFORMANCE TESTS
PERFORMANCE EVALUATION OF APPRENTICE MEDICAL MATERIEL SPECIALISTS.
AD-434 041 DIV. 28
PERFORMANCE EVALUATION OF APPRENTICE AIR PASSEN- GER SPECIALISTS.
AD-434 042 DIV. 28

TRAINING DEVICES
DESIGN
TRAINING ANALYSIS PROCEDURE (TAP), VOLUME II THEORETICAL DEVELOPMENT.
AD-434 814 DIV. 23

TRAINING DEVICES
NAVAL TRAINING
TRAINING ANALYSIS PROCEDURE (TAP), VOLUME II THEORETICAL DEVELOPMENT.
AD-434 814 DIV. 23

TRANSDUCERS
ELECTRICAL IMPEDANCE
MUTUAL AND SELF-RADIATION IMPEDANCES IN AN ARRAY OF FREE-FLOODING, COAXIAL, SPACED RING TRANSDUCERS.
AD-434 698 DIV. 8

TRANSDUCERS
HALL EFFECT
STABILITY OF NULL VOLTAGE OF HALL GENERATORS FOR DIGITAL TRANSDUCER READOUT HEADS.
AD-434 401 DIV. 8
HIGH POWER, HIGH VOLTAGE, AUDIO FREQUENCY TRANSFORMER DESIGN MANUAL.
AD-434 354 DIV. 7

TRANSISTORS
EPITAXIAL GROWTH
PRODUCTION DEVELOPMENT OF A SILICON PLANAR EPITAXIAL TRANSISTOR WITH A MAXIMUM OPERATING FAILURE RATE OF 0.001% PER 1000 HOURS AT A CON- FIDENCE LEVEL OF 90% AT 25 C.
AD-433 710 DIV. 8
PRODUCTION ENGINEERING MEASURE, STEP 1, ON 400 MC, 300 MW POWER TRANSISTOR.
AD-435 097 DIV. 8

TRANSISTORS
MANUFACTURING METHODS
PEM FOR TRANSISTOR MANUFACTURING PROCESS IMPROVEMENT.
AD-433 654 DIV. 8
PRODUCTION ENGINEERING MEASURE, MECHANIZATION OF SEMICONDUCTOR DEVICES, 2N540, 2N1051, 2N1072, 2N1193, 1N664, 1N665, 1N666, 1N667, 1N668, 1N669, 1N673, 1N675, 1N697 AND 1N701.
AD-433 773 DIV. 8

TRANSISTORS
OSCILLATION
INTERNAL OSCILLATIONS IN P-N-P-N TRANSISTORS.
AD-433 541 DIV. 8

TRANSISTORS
PRODUCTION
PRODUCTION ENGINEERING MEASURES TO INCREASE TRANSISTOR RELIABILITY.
AD-433 496 DIV. 8
PRODUCTION ENGINEERING MEASURE, MECHANIZATION OF SEMICONDUCTOR DEVICES 2N559-2N1094.
AD-433 812 DIV. 8
PRODUCTION ENGINEERING MEASURES TO IMPROVE TRANSISTOR RELIABILITY.
AD-434 402 DIV. 8

TRANSISTORS
RELIABILITY (ELECTRONICS)
FAILURE MECHANISMS IN SILICON SEMICONDUCTORS.
AD-434 762 DIV. 8
PROCESS AND FLOW CHART MANUAL FOR INTERDIGITATED SILICON TRANSISTOR PROGRAM.
AD-434 351 DIV. 8

TRANSISTORS
VERY HIGH FREQUENCY
TRANSISTOR, VHF, SILICON, POWER (10W-500MC).
AD-434 188 DIV. 8

TRANSITION ELEMENTS
SILICON COATINGS
INVESTIGATION OF DIFFUSION OF SILICON IN CERTAIN TRANSI-TIONAL METALS.
AD-434 940 DIV. 17

TRANSPONDERS
C-BAND
SUPERSENSITIVE CRYSTAL VIDEO TRANSPONDER SET AN/DPN-(XE-1).
AD-433 697 DIV. 8

TRANSPONDERS
SPACEBORNE
SATELLITE RATED MISTRAM TRANSPONDE STUDY,
AD-434 793 DIV. 5

TRIAZINES
POLYAMIDE PLASTICS
SYNTHESIS OF POLYAMIDES CONTAINING S-TRIAZINE RINGS,
AD-433 664 DIV. 4

TRIODES
FEASIBILITY STUDIES
FEASIBILITY STUDY OF POWER TRIODE,
AD-434 235 DIV. 8

TRITIUM
SORPTION
THE SORPTION OF TRITIUM AND TRITIATED WATER VAPOR BY A FOAMED POLYVINYLCHLORIDE (ENSOLITE),
AD-434 218 DIV. 23

TROPOSPHERE
HEAT TRANSFER
RADIATION BALANCE OF THE TROPOSPHERE AND OF THE EARTH-ATMOSPHERE SYSTEM IN THE ARCTIC,
AD-433 672 DIV. 2

TROPOSPHERE
SCATTERING
COMPARISON OF PRECIPITATION AND TROPOSPHERIC SCATTERING CROSS SECTIONS,
AD-434 836 DIV. 5

TRYPSIN
INHIBITION
A FORCE-AREA STUDY OF MIXED FILMS OF TRYPSIN AND OVOMUCOID,
AD-433 674 DIV. 16

TUNNEL DIODES
MICROWAVE EQUIPMENT
MICROWAVE DIODE RESEARCH,
AD-434 573 DIV. 8

TUNNEL DIODES
MIXERS (ELECTRONIC
DIODE, MILLIMETER WAVE TYPE MIXER (3.2 MM),
AD-433 797 DIV. 8

TUNNEL DIODES
OSCILLATORS
AN L-BAND TUNNEL DIODE OSCILLATOR,
AD-434 553 DIV. 8

TURBINES
REENTRY VEHICLES
EFFECT OF REYNOLDS NUMBER ON TURBINE PERFORMANCE AT VARIOUS MACH NUMBERS,
AD-433 589 DIV. 12

TURBOPUMPS
ROCKET MOTORS (LIQUID PROPELLANT)
TRANSIENT TESTS OF THE YLR 87-AJ-5 ROCKET ENGINE TURBOPUMP WITH THE REDESIGNED FUEL PUMP AND ASSO- CIATED PROPULSION EQUIPMENT,
AD-434 861 DIV. 27

TURBULENCE
HIGH-ALTITUDE
ACOUSTIC DETECTION OF HIGH -ALTITUDE TURBULENCE,
AD-434 703 DIV. 2

ULTRASONIC RADIATION
TEST METHODS
ULTRASOUND,
AD-434 996 DIV. 13

ULTRAVIOLET DETECTORS
BOILERS
EVALUATION OF THOMAS A. EDISON INDUSTRIES FLAME FAILURE ALARM UNIT,
AD-433 639 DIV. 31

UNDERGROUND EXPLOSIONS
EXPERIMENTAL DATA
PROJECT SHOAL VOLUNTEER TEAM PROGRAM,
AD-434 785 DIV. 20

UNDERGROUND STRUCTURES
CYLINDRICAL BODIES
THE INTERACTION BETWEEN A STRUCTURAL TUBE AND THE SURROUNDING SOIL,
AD-433 522 DIV. 13

UNDERWATER EXPLOSIONS
DAMAGE CONTROL
STARSHINE PROGRAM FOR STORAGE, RETRIEVAL, AND ANALYSIS OF SHOCK-DAMAGE INFORMATION,
AD-433 795 DIV. 31

UNDERWATER EXPLOSIONS
TEST METHODS
HYDRA PROGRAM HYDRA 118 SERIES, INVESTIGATION BY WATER SAMPLING OF THE INTERNAL STRUCTURE OF COLUMNS RESULTING FROM SMALL SHALLOW UNDERWATER EXPLOSIONS,
AD-434 301 DIV. 22

UNDERWATER OBJECTS
MATHEMATICAL MODELS
A STUDY IN UNDERWATER FLUTTER,
AD-433 061 DIV. 9

UNDERWATER SOUND
HYDROPHONES
COMPARISON OF THEORETICAL AND EXPERIMENTAL VALUES OF SPATIAL CORRELATION,
AD-433 749 DIV. 25

UPPER ATMOSPHERE
ABSTRACTS
PHENOMENA IN THE UPPER ATMOSPHERE, COMPILATION OF ABSTRACTS FROM SOVIET LITERATURE,
AD-433 606 DIV. 2
PHENOMENA IN THE UPPER ATMOSPHERE, REVIEW OF SOVIET LITERATURE,
AD-434 205 DIV. 2

UPPER ATMOSPHERE
DENSITY
CONSIDERATIONS ON ANALYSIS OF ATMOSPHERIC STRUCTURE DATA WITH EMPHASIS ON THE COMPUTATION OF THE ANGULAR DISTANCE FROM THE SUB-SOLAR POINT,
AD-433 691 DIV. 2

URINE
COLLECTING METHODS
HUMAN WASTE COLLECTION AND STORAGE DURING AEROSPACE FLIGHT,
AD-433 574 DIV. 16

VACCINES
VIRUSES
SELECTED ARTICLES FROM ZHURNAL MIKROBIOLOGII, EPIDEMIOLOGII I IMMUNOBIOLOGII VOL 40, NO. 7, 1963,
AD-434 298 DIV. 16

VACUUM APPARATUS
DESIGN
THE DESIGN AND USE OF DIFFUSION PILL DEVICES IN ULTRA-HIGH VACUUM APPLICATIONS,
AD-434 746 DIV. 25
THE STRUCTURE AND STRENGTH OF EPITAXIAL FILMS,
AD-434 805 DIV. 25

VALVES
BLOWERS
DIAMOND POWER SPECIALTY CORPORATIO 1-1/2IN, - 1500 PSI, TYPE I, CLASS 2, STYLE A BOILER BLOW- DOWN ANGLE VALVE,
AD-433 592 DIV. 24

VAPOR PLATING
LOW-TEMPERATURE RESEARCH
LOW TEMPERATURE VAPOR GROWTH STUDIES,
AD-433 640 DIV. 25

VAPORS
CONDENSATION
KINETICS OF CONDENSATION FROM THE VAPOR PHASE,
AD-434 286 DIV. 4

VARACTOR DIODES
MANUFACTURING METHODS
VARACTOR DIODE INDUSTRIAL PREPAREDNESS MEASURES,
AD-434 575 DIV. 8
VARACTOR DIODE INDUSTRIAL PREPAREDNESS MEASURES,
AD-434 576 DIV. 8
VARACTOR DIODE INDUSTRIAL PREPAREDNESS MEASURES,
AD-434 611 DIV. 8

VARACTOR DIODES
MICROWAVE EQUIPMENT
MICROWAVE DIODE RESEARCH,
AD-434 573 DIV. 8

VARACTOR DIODES
PARAMETRIC AMPLIFIERS
DEVELOPMENT OF A LOW-NOISE MILLIMETER-WAVE PARA- METRIC AMPLIFIER,
AD-434 062 DIV. 8

VEHICLES
UNDERWATER
A STUDY IN UNDERWATER FLUTTER,
AD-433 061 DIV. 9

VENTILATION DUCTS
PROTECTIVE COVERINGS
MODEL STUDIES OF LARGE-VENTED OPENINGS-PHASE 1,
AD-434 222 DIV. 13

VENUS
WATER VAPOR
A WATER-CLOUD INTERPRETATION OF VENUS' MICROWAVE CONTINUUM,
AD-434 501 DIV. 2

VERY LOW FREQUENCY
ELECTROMAGNETIC WAVES
EXTRA LONG WAVES PROPAGATION WITH ROCKETS,
AD-434 771 DIV. 8
PROPAGATION OF VLF WAVES IN HIGHLY CONDUCTING MEDIUM,
AD-434 776 DIV. 2
SHOCK, VIBRATION AND ASSOCIATED ENVIRONMENTS, PART IV,
AD-433 726 DIV. 13

VIBRATION
MEASUREMENT
SHEAR STRESS MEASUREMENTS IN SITU OF SOILS SUBJECTED TO VIBRATORY LOADS,
AD-433 800 DIV. 28

VIBRATION
SHIP STRUCTURAL COMPONENTS
COLLECTION OF REPORTS ON VIBRATION SURVEYS,
AD-434 328 DIV. 31

VIBRATORS (ELECTRICAL)
ION SOURCES
VACUUM VIBRATOR ION SOURCE,
AD-434 675 DIV. 30

VINYL PLASTICS
BORON COMPOUNDS
HIGH-TEMPERATURE OR LOW-TEMPERATUI RESISTING ELASTOMERS CONTAINING BORON,
AD-434 904 DIV. 4
HIGH-TEMPERATURE OR LOW-TEMPERATUI RESISTING ELASTOMERS CONTAINING BORON,
AD-434 905 DIV. 4

VIRUSES
INFECTIONS
THE EFFECT OF ZYMOSAN AND ENDOTOXIN TREATMENT ON EXPERIMENT AL COXSACKIE B VIRUS INFECTION,
AD-434 082 DIV. 16

VISCOELASTICITY
SOLIDS
FREQUENCY RESPONSE OF NON-LINEAR VISCOELASTIC SOLIDS,
AD-434 682 DIV. 28

VISCOSITY
SOLUTIONS
DILUTE SOLUTION PROPERTIES OF HIGH-MOLECULAR WEIGHT POLY(ISOBUTYL METHACRYLATE), I. VISCOSITY IN METHYL ETHYL KETONE,
AD-434 893 DIV. 19

VISION
ILLUMINATION
VISUAL RECOVERY FROM BRIEF EXPOSURES TO VERY HIGH LUMINANCE LEVELS,
AD-434 729 DIV. 16

VOICE COMMUNICATION SYSTEMS
STIMULATION
COMMUNICATIONS, SEMANTICS, AND INFORMATION SYSTEMS,
AD-434 029 DIV. 5

VORTICES
SEPARATION
SEPARATED FLOW ABOUT LIFTING BODIES,
AD-433 818 DIV. 9

VULCANIZATES
AGING (MATERIALS)
IMPROVEMENT OF HIGH TEMPERATURE PROPERTIES OF A FLUOROELASTOMER,
AD-434 350 DIV. 14

WAKE
HYPERSONIC CHARACTERISTICS
A THEORY OF HYPERSONIC LAMINAR AND TURBULENT VISCOUS WAKES AT CHEMICAL EQUILIBRIUM,
AD-433 917 DIV. 9

WARFARE
GAME THEORY
STUDY FOR HYPOTHETICAL NARRATIVES FOR USE IN COMMAND AND CONTROL SYSTEMS PLANNING VOLUME III,
AD-435 038 DIV. 18

WARFARE
STOCHASTIC PROCESSES
THE DISTRIBUTION OF ROUNDS FIRED IN STOCHASTIC DUELS
AD-433 769 DIV. 18

WASTES (SANITARY ENGINEERING)
COMBUSTION
COMBUSTION OF HUMAN WASTE AND PRODUCT RECOVERY,
AD-434 115 DIV. 16

WATER
SAMPLING
HYDRA PROGRAM HYDRA 118 SERIES, INVESTIGATION BY WATER SAMPLING OF THE INTERNAL STRUCTURE OF COLUMNS RESULTING FROM SMALL SHALLOW UNDERWATER EXPLOSIONS,
AD-434 301 DIV. 22

WATER SUPPLIES
RADIOLOGICAL CONTAMINATION
VULNERABILITY OF MUNICIPAL WATER FACILITIES TO RADIOACTIVE CONTAMINATION FROM NUCLEAR ATTACKS,
AD-434 091 DIV. 20

WATER VAPOR
TRITIATED COMPOUNDS
THE SORPTION OF TRITIUM AND TRITIATED WATER VAPOR BY A FOAMED POLYVINYLCHLORIDE (ENSOLITE),
AD-434 218 DIV. 23

WAVEGUIDE WINDOWS
SCIENTIFIC RESEARCH
HIGH POWER R-F WINDOW STUDY PROGRAM,
AD-433 791 DIV. 8

WEATHER FORECASTING
STATISTICAL ANALYSIS
A HISTORICAL SURVEY OF STATISTICAL WEATHER PREDICTION,
AD-433 743 DIV. 2

WEATHER STATIONS
SATELLITES (ARTIFICIAL)
WEATHER SATELLITE DATA PROCESSING,
AD-433 731 DIV. 2

WEIGHT
BALANCES
DESIGN EVALUATION/QUALIFICATION
TEST OF CRYOGENIC CALIBRATION
WEIGHT SYSTEM, MEASURING
AND RECORDING,
AD-433 376 DIV. IDEP

WELDING
MICROSTRUCTURE
INFLUENCE OF ALLOYING ELEMENTS
ON THE CONTINUOUS COOLING
TRANSFORMATION AND WELDABILITY
OF BINARY AND TERNARY ALLOYS
OF IRON,
AD-434 008 DIV. 17

WELDING
PRESSURE
HERMETIC SEALING OF PROPELLANT
CONTAINERS BY PRESSURE
WELDING,
AD-434 175 DIV. 24

WIND TUNNEL MODELS
MOTION
CERTAIN GENERALIZATIONS AND
RESULTS OF INVESTIGATING
THE THEOREM OF REVERSIBILITY
FOR A TRANSIENT MOTION,
AD-434 992 DIV. 9

WIND TUNNEL MODELS
SYMPOSIA
PROCEEDINGS OF SYMPOSIUM
ON AEROELASTIC AND DYNAMIC
MODELING TECHNOLOGY, 23 24
25 SEPTEMBER 1963, DAYTON,
OHIO,
AD-434 797 DIV. 9

WIND TUNNEL NOZZLES
NOZZLE INSERTS
EVALUATION OF THROAT MATERIALS
IN THE HOTSHOT TUNNEL F
AD-433 670 DIV. 30

WIND TUNNELS
FEASIBILITY STUDIES
A MAGNETIC WIND TUNNEL BALANCE,
AD-434 844 DIV. 30

WIRE
DRAWING (MACHINE PROCESSING)
ARRANGEMENT FOR DRAWING WIRE
WITH THE USE OF ULTRASOUND,
AD-433 525 DIV. 26

WOOD
NON-DESTRUCTIVE TESTING
PROCEEDINGS OF THE SYMPOSIUM
ON NONDESTRUCTIVE TESTING
OF WOOD,
AD-434 815 DIV. 14

X RAYS
CAMERA TUBES
NONDESTRUCTIVE SYSTEM FOR
INSPECTION OF FIBER GLASS
REINFORCED PLASTIC MISSILE
CASES AND OTHER STRUCTURAL
MATERIALS,
AD-434 819 DIV. 8

X-BAND
MICROWAVE AMPLIFIERS
HIGH POWER X-BAND GENERATOR,
AD-433 704 DIV. 8

ZINC COMPOUNDS
SULFIDES
OPTICAL QUENCHING AND STIMULATION
OF CERTAIN ZNS PHOSPHORS,
AD-434 970 DIV. 25

NON-MILITARY AND OLDER MILITARY RESEARCH REPORTS

*Descriptors marked with an asterisk are listed in the subject index.

AGRICULTURE

TID-19248
California Univ., Los Angeles.
ETHYLENEDIAMINE DI (o-HYDROXYPHENYL ACETATE) INFLUENCE ON Fe UPTAKE AND TRANSLOCATION IN BUSH BEANS
A. Wallace, C. Carmack, AND G. A. Wallace.
[26 Apr 63] 18p
Contract AT(11-1)34
OTS $1.60

DESCRIPTORS: *Plants (Botany), *Iron, Distribution, *Chelate compounds

ASTRONOMY

Astrophysics

NASA-TR-R-176
Goddard Space Flight Center, National Aeronautics and Space Administration, Greenbelt, Md.
A DISCUSSION OF HALPHEN'S METHOD FOR SECULAR PERTURBATIONS AND ITS APPLICATION TO THE DETERMINATION OF LONG RANGE EFFECTS IN THE MOTIONS OF CELESTIAL BODIES, PART I
Peter Musen. Dec 63, 56p
N64-17826
OTS $1.50

NASA-TR-R-173
Goodard Space Flight Center, National Aeronautics and Space Administration, Greenbelt, Md.
THE STRUCTURE AND STRENGTH OF THE INNER PLANETS
Gordon J. F. MacDonald. Dec 63, 86p
N64-17518
OTS $2.25

NASA-TN-D-2248
Iowa State Univ., Iowa City.
THE EDGE OF THE POLAR PLATEAU FOR GALACTIC COSMIC RAYS AND THEIR CHARGED ALBEDO
J. A. Van Allen and W. C. Lin. Apr 64, 13p
Grant NsG-233-62 and Contract N9onr-93803
N64-17828
OTS $0.50

N64-16731
Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
ON THE INTERNAL CONSTITUTION OF THE TERRESTRIAL PLANETS
R. A. Lyttleton. 21 Sep 63, 70p
Contract NAS7-100
Technical rept. no. 32-522; NASA CR-53089
OTS $6.60

DESCRIPTORS: *Planets, *Solar systems, Models (Simulations), *Geogony, Equations, Numerical analysis, Earth models.

TID-20306
Lawrence Radiation Lab., Univ. of California, Livermore.
HELIOCENTRIC COORDINATES OF MARS, 1800-2000
Joseph L. Brady and Edna Vienop, May 62, 408p
Contract W7405-eng-48
OTS $5.00

N64-16758
Rand Corp., Santa Monica, Calif.
THE PHYSICAL EPHEMERIS OF MARS
G. de Vaucouleurs. Jan 64, 24p
Contract NASr-21(04)
Memo RM-3999-NASA; NASA CR-53117
OTS $2.60

DESCRIPTORS: *Mars, *Astronomical data,

N64-16765
Rand Corp., Santa Monica, Calif.
SOURCES OF AEROGRAPHIC COORDINATES, 1877-1907
G. De Vaucouleurs and R. Wright. Jan 64, 73p
Contract NASr-21(04)
Memo no. RM-3991-NASA; NASA CR-53064
OTS $7.60

DESCRIPTORS: *Mars, *Planets, *Extraterrestrial topography, Position finding, Maps, Records, Astrophysics.

BEHAVIORAL SCIENCES

Human Engineering

NASA-CR-21
Douglas Aircraft Co., Inc., Long Beach, Calif.
HUMAN TRACKING PERFORMANCE UNDER TRANSVERSE ACCELERATIONS
L. G. Summers and A. A. Burrows. Feb 64, 83p
Contract NASr-68
N64-16534; N64-11111 superseded
OTS $2.25

DESCRIPTORS: *Human engineering, *Tracking, *Acceleration tolerance, Display systems, Pilots, Motor reactions.

NASA-TN-D-2177
Langley Research Center, National Aeronautics and Space Administration, Langley Station, Va.
MEASURED TRANSFER FUNCTIONS OF PILOTS DURING TWO-AXIS TASKS WITH MOTION
Hugh P. Bergeron and James J. Adams. Mar 64, 42p
N64-17157
OTS $1.00

DESCRIPTORS: *Pilots, *Human engineering, *Positioning reactions, Analog systems, *Psychomotor tests, Functions.

SCR-685
Sandia Corp., Albuquerque, N. Mex.
A METHOD FOR PERFORMING A HUMAN-FACTORS RELIABILITY ANALYSIS
A. D. Swain. Aug 63, 61p
Contract AT(29-1)789
OTS $1.50

Personnel and Training

BAW-1164(Vol. V)
Babcock and Wilcox Co., Lynchburg, Va.
NUCLEAR MERCHANT SHIP REACTOR. VOLUME V. CREW TRAINING. Final Safeguards rept. Sep 60, 92p
Contract AT(30-3)274
OTS $8.60

Psychology

PB-165 265
Institute of Communications Research, Univ. of Illinois [Urbana].
BIBLIOGRAPHICAL CITATION CHARACTERISTICS OF THE PSYCHOLOGICAL JOURNAL NETWORK IN 1950 AND IN 1960. Terminal rept. on Scientific Information Exchange in Psychology
Louis V. Xhignesse and Charles E. Osgood. Nov 63, 94p
Grant NSF-G-18494
OTS $8.60

DESCRIPTORS: *Bibliographies, Psychology, *Periodicals, Information retrieval

The study concerns itself with some of the characteristics of bibliographical citations in the same 21 psychological journals published both in 1950 and in 1960. The list of the journals includes 8 journals published by The American Psychological Association and 13 journals published by other organizations. (See also PB-163 613)

PB-165 266
Institute of Communications Research, Univ. of Illinois [Urbana]
CONNOTATIONS OF TWENTY PSYCHOLOGICAL JOURNALS TO THEIR PROFESSIONAL READERS. Rept. on Scientific Information Exchange in Psychology
Leon A. Jakobovits and Charles E. Osgood. Nov 63, 34p
Grant NSF-G-18494
OTS $3.60

DESCRIPTORS: *Periodicals, *Psychometrics, Factor analysis, Psychology, Scientific personnel.

A pilot study on the "images" of 20 psychological journals was made. Judgments of the 20 journals against 20 semantic differential scales were collected from approximately 50 students and staff at Harvard, Stanford, and Illinois. Factor analysis of the scales yielded three main factors, identified as seriousness, value and interestingness. By assigning factor scores to the journals, it was possible to display their clustering in the three-factor space as well as their connotative differences. (Author) (See also PB-165 265)

BIOLOGICAL SCIENCES

BNL-6204
Brookhaven National Lab., Upton, N. Y.
EFFECTS OF INSULIN ON HEPATIC GLUCOSE METABOLISM AND GLUCOSE UTILIZATION BY TISSUES
R. C. de Bodo, R. Steele, N. Altszuler, A. Dunn, and J. S. Bishop. 16 Jul 62, 36p Prepared in cooperation with New York Univ. School of Medicine.
Contract AT(30-2)GEN-16
OTS $3.60

UCRL-10178
Lawrence Radiation Lab., Univ. of California, Berkeley.
ELECTRON PARAMAGNETIC RESONANCE IN PHOTOSYNTHETIC STUDIES
G. M. Androes. 25 Apr 62, 87p
Contract W7405-eng-48
OTS $8.10

DESCRIPTORS: *Photosynthesis, *Paramagnetic resonance, *Biophysics.

TID-19250
Louisville Univ., Ky.
GROWTH OF ALGAE IN THE DARK, A TRACER STUDY. I. USE OF ORGANIC C^{14} LABELLED COMPOUNDS TO DETERMINE THE UPTAKE OF DISSOLVED ORGANIC SUBSTANCES USED BY ALGAE UNDER AUTOTROPHIC AND HETEROTROPHIC CONDITIONS. II Final rept. for 15 Apr 61-15 Apr 63
Daniel F. Jackson. Aug 63, 90p
Contract AT(40-1)2848
OTS $8.10

DESCRIPTORS: *Algae, Organic compounds, *Plankton, *Photosynthesis, *Growth substances, *Tracer studies.

PB-165 286
Marine Lab., Univ. of Miami [Coral Gables] Fla.
TOXICITY EXPERIMENTS ON BARNACLE AND BRINE SHRIMP LARVAE. Final rept.
Charles E. Lane. [1963] 13p
Contract MA-3375
Rept. no. ML 64038, 8265
OTS $1.60

DESCRIPTORS: *Crustacea, *Barnacles, Toxicity, Fouling, Toxic tolerances, Mercury compounds, Chlorides, *Pesticides.

The investigation was designed to evaluate the toxicity of mercuric chloride for Balanus amphitrite niveus under standardized, controlled conditions, as a part of a worldwide investigation of the resistance of a variety of fouling organisms to this toxicant. 300 Balanus cyprids and 900 control Artemia salina larvae were exposed to mercuric chloride concentrations of 10, 100, and 1000 mg/l in 2.1% Cl^- sea water. The LD_{50_t} for Balanus at 1000 mg/l was 120 minutes; at 100 mg/l it was 225 minutes; and at 10 mg/l it was more than 500 minutes. Artemia larvae at the same mercuric chloride concentrations showed LD_{50_t}'s of 135 minutes, 285 minutes, and more than 500 minutes. Artemia larvae were significantly more sensitive to mercuric chloride when the chlorinity was reduced to 1.8% . (Author)

PB-165 284
NAS-NRC Committee on Hearing, Bioacoustics, and Biomechanics, Washington, D. C.
CHABA - 1963. Annual rept., Jan-Dec 63
Milton A. Whitcomb. Feb 64, 37p
OTS $3.60

DESCRIPTORS: *Space medicine, *Biophysics, *Hearing, Vibration, Acoustics

A summary is given of the 1963 annual meeting of CHABA and the activities of its various working groups.

TID-16090
Oak Ridge Gaseous Diffusion Plant, Tenn.
A SEMI-AUTOMATIC APPARATUS AND METHOD FOR ALPHA ACTIVITY DETERMINATION IN URINE
T. C. Whitson and T. Kwasnoski. [29 Jun 62] 14p
Contract W7405-eng-26
OTS $1.60

DESCRIPTORS: *Uranium, Determination, *Urine, Analysis

N64-16325
School of Aerospace Medicine, Brooks AFB, Tex.
ECOLOGIC RELATIONSHIP BETWEEN BACTERIA AND ALGAE IN PHOTOSYNTHETIC GAS EXCHANGERS.
Quarterly status rept., 1 Aug 63- 31 Oct 63
[1963] 7p
NASA Order R-99
NASA CR-55423
OTS $1.10

DESCRIPTORS: *Ecology, *Bacteria, *Algae, Culture media, Photosynthesis

N64-16328
Washington Univ., St. Louis, Mo. School of Medicine.
HISTOLOGICAL STUDIES ON THE INNER EARS OF SELECTED MONKEYS. Final rept., 1 Sep 61- 31 Dec 63
Catherine A. Smith. 1963, 6p
Grant NsG-267-62
NASA CR-55517
OTS $1.10

DESCRIPTORS: Primates, *Ear, *Histology.

IS-483
Ames Lab., Iowa State Univ. of Science and Tech.
EXPERIMENTAL TRAINING MODEL FOR CLOSE CHEST. CARDIAC MASSAGE DEVELOPED AT THE AMES LABORATORY. 27 Jul 62, 6p
Contract W7405-eng-82
OTS $1.10

PB-165 281
Burke Foundation Rehabilitation Center, White Plains, N. Y.
[THE NUTRITIONAL AND METABOLIC EFFECTS OF DISEASE, PHYSICAL STRESS, AND FOOD AND DRUG ACTIONS]. Annual progress rept., 1963
Anthony A. Albanese. [1964] 16p
OTS $1.60

DESCRIPTORS: *Nutrition, *Metabolism, Smokes, *Cigarettes, *Proteins, *Steroids, *Enzymes, *Fats, Diseases, Stress (Physiology), Food, Drugs,

Topics include: nutritional individuality of protein utilization; cigarette smoke exposure and protein utilization; physical activity and protein metabolism; nutritional and metabolic effects of newer steroids; proteolytic enzymes; and fat metabolism.

TID-19240
California Univ., Los Angeles School of Medicine.
BRAIN CONCENTRATION OF RESERPINE-H^3 AND ITS METABOLITIES IN THE MOUSE
C. Maggiolo and Thomas J. Haley. [30 Jul 63] 7p
Contract AT(04-1)GEN-12
OTS $1.10

DESCRIPTORS: *Resperine, *Brain

TID-19255 (Pt. II)
Chicago Univ., Ill.
STUDIES ON THE RAT ELECTRORETINOGRAM AND THE INITIAL STAGES OF VISUAL EXCITATION
Richard A. Cone. Doctoral thesis. [1963] 64p
Contract AT(11-1)952
OTS $6.60

DESCRIPTORS: *Eye, Light, *Rats, Vision,

TID-18990
Creighton Univ., Omaha, Neb. School of Medicine.
EVALUATION AND INTERPRETATION OF CALCIUM-KINETIC DATA IN MAN
Robert P. Heaney. [1962] 42p Prepared in cooperation with Creighton Memorial St. Joseph's Hospital
Contract AT(11-1)587
OTS $4.60

DESCRIPTORS: *Calcium, Bone, *Metabolism, *Bibliographies

NAS-NRC-1181
Mine Advisory Committee, NAS, NRC, Washington, D. C.
PROCEEDINGS: SYMPOSIUM ON UNDERWATER PHYSIOLOGY (2nd), FEBRUARY 25-26, 1963, WASHINGTON, D. C.
Christian J. Lambertsen and Leon J. Greenbaum, Jr., eds. 1963, 205p
Contract Nonr 2300(10)
NAS-NRC $4.00

DESCRIPTORS: *Diving, *Decompression sickness, *Respiration, *Hypoxia, *Anesthesia, Stress (Physiology), Oxygen, Blood chemistry, Physiology, *Conferences,

These proceedings represent a compilation of those papers presented at the Second Symposium on Underwater Physiology, February 25-26, 1963, sponsored by the Office of Naval Research and the Mine Advisory Committee of the National Academy of Sciences-National Research Council. The range of interests covered includes oxygen toxicity, decompression and bends, and respiratory problems, with special emphasis on their implications in underwater swimming Some of the earlier work in these areas of interest are re-examined in the light of current problems. (Author)

N64-16330
Naval School of Aviation Medicine, Pensacola, Fla.
REDUCTION OF NYSTAGMUS AND DISORIENTATION IN HUMAN SUBJECTS
Frederick E. Guedry, Ashton Graybiel, and William E. Collins. 19 Jun 62, 11p
NASA Order R-47
Proj. MR005.13-6001, R-69; NASA CR-55756
OTS $1.60

DESCRIPTORS: Reduction, *Motion sickness, *Nystagmus, Ear, Eye, Physiology, *Aviation medicine.

Biochemistry

TID-17884
Alberta Univ., Edmonton (Canada)
THE BIOLOGICAL ACTIVITIES OF NUCLEIC ACIDS. Annual progress rept.
John S. Colter. 1 Feb 63, 10p
Contract AT(30-1)2967
OTS $1.10

DESCRIPTORS: *Viruses, *Nucleic acids

HW-SA-2588
Hanford Atomic Products Operation, Richland, Wash.
REACTIVITIES OF ORGANIZED BIOCHEMICAL SYSTEMS WITH RADIATION-PRODUCED RADICALS
Donald R. Kalkwarf. [25 May 62] 9p
Contract AT(45-1)1350
OTS $1.10

DESCRIPTORS: *Free radicals, Amino acids, *Polysaccharides, *Erythrocytes, *Carbohydrates, Hemolysis.

N64-16322
Naval Medical Research Inst., Bethesda, Md.
QUARTERLY REPORT COVERING PERIOD OCTOBER-DECEMBER 1963 [I. HUMAN ENERGETICS. II. MOLECULAR ENERGETICS]
T. H. Benzinger. [1963] 13p
NASA Order R-38
NASA CR-55562
OTS $1.60

DESCRIPTORS: *Biosynthesis.

Medical Specialties and Equipment

AD-423 386
Denry Corp., Los Angeles, Calif.
RESEARCH AND DEVELOPMENT ON AN EXPANDABLE FOAMED PLASTIC FIELD HOSPITAL LITTER-BED. Final rept., Phase I
John L. Benton. 1 Oct 63, 37p
Contract DA49-193-MD-2422
OTS $1.00

DESCRIPTORS: *Medical equipment, Portable, Feasibility studies, *Expanded plastics, *Isocyanate plastics, Catalysts, Containers, Buoyancy, Transportation.

The feasibility of a foamed-in-place field hospital Litter-Bed was demonstrated. A suitable method of shape control was devised and proven successful. Considerable development work resulted in techniques that readily permit lengthwise foaming of the shaped envelope. A satisfactory support harness was developed for manual carrying and patient immobilization. The Litter-Bed's dimensions are such that it will accomodate the 99th percentile of the U. S. Army personnel. Because of the unique design characteristics of the Litter-Bed, it not only can be transported in any vehicle presently capable of carrying litters but can be readily adapted for use with vehicles not ordinarily used for evacuation of wounded. The folded, unexpanded Litter-Bed and cannister can be encased within a quick-release, relatively small, easily stored package capable of withstanding a wide range of temperatures and storage modes. (Author)

AD-423 383
Linde Co., Ionawanda, N. Y.
IN VIVO EVALUATION OF PROCESSES FOR THE LOW TEMPERATURE PRESERVATION OF HUMAN BLOOD BASED ON RAPID COOLING AND WARMING AND PROTECTION BY POLYMERS. Progress rept. no. XV, Jul 62-Jul 63, on Research on Procedures for the Low-Temperature Preservation of Blood
A. P. Rinfret. 1 Nov 63, 25p
Contract Nonr-3003(00)
OTS $0.75

DESCRIPTORS: *Blood, *Preservation, Freezing, Blood transfusions, Polymers, Organic nitrogen compounds, Ketones,

Two distinct cryogenic preservation procedures for blood using extracellular polymers were investigated using autologous transfusions for survival measurement. Processing was conducted in half or one pint

quantities and a portion or all of the red cells transfused either directly as thawed, as packed cells or as cells resuspended in autologous plasma. Average survival data which are differentiated according to variations in procedures are summarized. These results show that the use of albumin in conjunction with PVP (polyvinylpyrrolidone) as a protective additive stabilized the survival values of the frozen and thawed erythrocytes and also that the fasting state of the donor can contribute to the survival of these cells. Cells protected from freeze-thaw damage by extracellular polymers survived in-vivo to an extent comparable to that observed in blood banked by conventional procedures. (Author) (See also AD-299 116)

AD-422 666
Olin Mathieson Chemical Corp. [Niagara Falls, N. Y.]
DEVELOPMENT OF FOAM SPLINTS. Final technical rept., 15 Apr-14 Oct 63
C. H. Hofrichter and W. R. Andrews. 8 Nov 63, 32p
Contract DA49-193-MD-2416
OTS $0.75

DESCRIPTORS: *Medical supplies, *Expanded plastics, Fractures (Bone), Manufacturing methods, *Isocyanate plastics.

The feasibility of rigid urethane foam for emergency surgical splinting has been proved. Formulation of a system that is easy to mix and dispense, and that gives a rigid splint has been accomplished. A one-piece mold or container has been developed, to hold the foam during the period of rise and solidification, to protect against exotherm and pressure, and to help mold the foam to the shape of the injured area. Containers have been designed for use on various parts of the body, including full body support by a pallet. One-can disposable generators have proved feasible as a means of delivering the foam to the proper area. The removal of the cast at the proper time has been facilitated by development of a "triple stitched" container. When the correct thread is pulled, the cast separates for easy removal. (Author)

Microbiology

HW-SA-257∪
Hanford Atomic Products Operation, Richland, Wash.
STUDIES ON THE EFFECTS ON DEUTERIUM OXIDE ON YEAST
R. T. O'Brien. 24 May 62, 3p
Contract AT(45-1)1350
OTS $1.10

DESCRIPTORS: *Yeasts, *Heavy water.

American Society of Microbiology, Kansas City, Mo., 6-10 May 62

N64-16745
IIT Research Inst., Chicago, Ill.
LIFE IN EXTRATERRESTRIAL ENVIRONMENTS. Quarterly status rept., 15 Nov 63-15 Feb 64
Charles A. Hagen and Regnel Jones. 1964. 16p
Contract NASr-22
Rept. no. IITRI-C194-12; NASA CR-53106
OTS $1.60

DESCRIPTORS: *Space biology,

UCRL-11191
Lawrence Radiation Lab., Univ. of California, Berkeley.
TRYPTOPHAN SYNTHETASE MUTANTS OF YEAST: ACTION OF A SUPER-SUPPRESSOR IN RELATION TO ALLELIC MAPPING AND COMPLEMENTATION
Thomas R. Manney. Doctoral thesis. 8 Jan 64, 126p
Contract W7405-eng-48
OTS $2.50

DESCRIPTORS: *Yeasts, *Mutations, Tryptophan.

Radiobiology

TID-15508
Argonne National Lab., Ill.
A SEX DIFFERENCE IN MOUSE SURVIVAL UNDER DAILY GAMMA IRRADIATION, AND ITS MODIFICATION BY GONADECTOMY
K. F. Hamilton, G. A. Sacher, and D. Grahn. Jan 62, 12p
Contract W31-109-eng-38
UAC-6111
OTS $1.60

DESCRIPTORS: *Mice, *Radiation effects

CONF-29-1
Brookhaven National Lab., Upton, N. Y.
AN APPROACH TO THE CHARACTERIZATION OF STEM CELLS IN MOUSE BONE MARROW
G. Cudkowicz, A. C. Upton, L. H. Smith, D. G. Gosslee, and W. L. Hughes. [1962] 25p
Prepared in cooperation with Oak Ridge National Lab.
Contract W7405-eng-26
OTS $2.60

DESCRIPTORS: *Bone marrow, *Radiation injuries, *Hemopoietic system

Conference on Modification of Radiation Injury by Bone Marrow Transplantation and Chemical Protection, New York, Dec 62

BNL-6202
Brookhaven National Lab., Upton, N. Y.
THE ULTRAVIOLET SENSITIVITY OF FROZEN PHAGE
Myron Levine and Emma Cox. Jul 62, 21p
Contract AT(30-2)GEN-16
OTS $1.60

DESCRIPTORS: *Bacteriophages, *Ultraviolet radiation, *Radiation effects

HW-SA-2613
Hanford Atomic Products Operation, Richland, Wash.
COMPARATIVE HISTOPATHOLOGY OF Pu^{239}, Ra^{226} AND Sr^{90} IN PIG BONE
W. J. Clarke. 10 Jun 62, 20p
Contract AT(45-1)1350
OTS $1.60

DESCRIPTORS: *Strontium, *Radium, *Plutonium, *Isotopes, Bone, *Swine, Pathology, *Radiation damage

HW-SA-2653
Hanford Atomic Products Operation, Richland, Wash.
DETECTION OF PLUTONIUM IN VIVO BY WHOLE BODY COUNTING
W. C. Roesch and H. E. Palmer. 27 Jul 62, 12p
Contract AT(45-1)1350
OTS $1.60

DESCRIPTORS: *Plutonium, Man, *Health physics

HW-SA-2605
Hanford Atomic Products Operation, Richland, Wash.
EFFECTS OF INGESTED PLUTONIUM-239 ON FECUNDITY, FERTILITY, AND LIFE SPAN OF HABROBRACON (HYMENOPTERA: BRACONDIDAE)
H. E. Erdman. 1962, 10p
Contract AT(45-1)1350
OTS $1.10

DESCRIPTORS: *Radiation effects, *Hymenoptera

HW-SA-2626
Hanford Atomic Products Operation, Richland, Wash.
EFFECTS OF INTRADERMAL INJECTIONS OF PLUTONIUM IN SWINE
J. W. Cable, V. G. Horstman, W. J. Clarke, and L. K. Bustad. 2 Jul 62, 16p
Contract AT(45-1)1350
OTS $1.60

DESCRIPTORS: *Plutonium, *Isotopes, Skin, *Swine

HW-SA-2509
Hanford Atomic Products Operation, Richland, Wash.
PROJECT CHARIOT RADIOECOLOGICAL STUDIES
J. J. Davis. 27 Mar 62, 13p
Contract AT(45-1)1350
OTS $1.60

DESCRIPTORS: Ecology, *Radiobiology

UCRL-10215
Lawrence Radiation Lab., Univ. of California, Berkeley.
HEALTH PHYSICS ASPECTS OF WHOLE-BODY IRRADIATION
Graham M. Hairr. 20 Jun 62, 23p
Contract W7405-eng-48
OTS $2.60

DESCRIPTORS: *Leukemia, *Yttrium, *Isotopes, *Immunity, Health physics

LAMS-3034
Los Alamos Scientific Lab., N. Mex.
BIOLOGICAL AND MEDICAL RESEARCH GROUP (H-4) OF THE HEALTH DIVISION. Annual rept. Jul 62-Jun 63.
Jul 63, 374p
Contract W7405-eng-36
OTS $4.50

DESCRIPTORS: Mammals, Metabolism, *Radiobiology.

LADC-5278
Los Alamos Scientific Lab., N. Mex.
BREEDING CHARACTERISTICS OF OFFSPRING FROM TEN GENERATIONS OF X-IRRADIATED SIRES. Rept. on Heritability of Radiation Damage.
J. F. Spalding, V. G. Strang, and W. L. LeStourgeon. 21 Aug 62, 15p
Contract W7405-eng-36
OTS $1.60

DESCRIPTORS: X-rays, *Mutations, *Mice, *Radiation effects, *Reproduction (Physiology)

LADC-5209
Los Alamos Scientific Lab., N. Mex.
COMPARATIVE METABOLISM OF RADIOISOTOPES IN MAMMALS. II. RETENTION OF IODINE^{131} BY FOUR MAMMALIAN SPECIES
J. E. Furchner and C. R. Richmond. [21 Aug 62] 31p
Contract W7405-eng-36
OTS $3.60

DESCRIPTORS: *Mammals, *Metabolism, *Iodine, Radioactive isotopes

LADC-5401
Los Alamos Scientific Lab., N. Mex.
THE EFFECT OF ANCESTRAL IRRADIATION EXPOSURE ON RADIORESISTANCE IN THEIR DESCENDANTS: RADIORESISTANCE IN OFFSPRING FROM IRRADIATED PARENTAGE
J. F. Spalding, V. G. Strang, and W. L. LeStourgeon 21 Aug 62, 24p
Contract W7405-eng-36
OTS $2.60

DESCRIPTORS: *Radiation effects, *Genetics

CONF-66-6
Michigan Univ., Ann Arbor.
RADIOIODINE CONCENTRATION IN FETAL HUMAN THYROID GLAND FROM FALL-OUT
William H. Beierwaltes, Martin T. J. Hilger, and Audrey Wegst. [1962] 8p
Contract AT(11-1)1203
OTS $1.10

DESCRIPTORS: *Thyroid gland, *Health physics, *Radioactive fallout.

Symposium on the Biology of Radioiodine, Richland, Wash., Jun 63

TID-19049
Worcester Foundation for Experimental Biology, Shrewsbury, Mass.
STUDIES ON BIOLOGICALLY ACTIVE AMINES.
Rept. for 1957-1963
Yutaka Kobayashi. 10 Jul 63, 6p
Contract AT(30-1)2085
OTS $1.10

DESCRIPTORS: *Histamine, *Metabolism, *Enzymes, Radiation effects.

CHEMISTRY

TID-16595
Argonne National Lab., Ill.
ION-EXCHANGE BEHAVIOR OF THE TRANSURANIUM ELEMENTS IN $LiNO_3$ SOLUTIONS
S. Adar, R. K. Sjoblom, R. F. Barnes, P. R. Fields, and E. K. Hulet. May 62, 13p Prepared in cooperation with Lawrence Radiation Lab., Univ. of California.
Contract W31-109-eng-38
UAC-6498
OTS $1.60

DESCRIPTORS: *Transuranium elements, *Ion exchange.

TID-15842
Argonne National Lab., Ill.
THE USE OF INFRARED SPECTROSCOPY IN INORGANIC CHEMISTRY
John R. Ferraro. [Apr 62] 7p
Contract W31-109-eng-38
UAC-6384
OTS $1.60

DESCRIPTORS: *Infrared spectroscopy, *Nitrates, *Phosphorus compounds,

BNL-6279
Brookhaven National Lab., Upton, N. Y.
VAPOR PRESSURES OF ISOTOPIC MOLECULES
Jacob Bigeleisen. 1962, 31p
Contract AT(30-2)GEN-16
OTS $3.60

DESCRIPTORS: *Vapor pressure, *Nitrogen, *Oxides.

CONF-76-5
Coates Chemical Labs., Louisiana State Univ., Baton Rouge.
DELAYED FLUORESCENCE OF SOLID SOLUTIONS OF POLYACENES. II. KINETIC CONSIDERATIONS
Tohru Azumi and Sean P. McGlynn. [1963] 31p
Contract AT(40-1)3018
OTS $3.60

DESCRIPTORS: *Naphthalenes, *Phenanthrenes, *Fluorescence

Symposium on Molecular Structure and Spectroscopy, Columbus, Ohio, Jun 63.

CONF-20-18
General Electric Co., Cincinnati, Ohio.
X-RAY CRYSTALLOGRAPHIC STUDIES OF EUROPIUM OXIDES AND HYDROXIDES
Robert C. Rau. [1962] 11p
Contract AT(40-1)2847
TM-63-2-8
OTS $1.60

DESCRIPTORS: *Europium, *Oxides, *Hydroxides, *X-ray diffraction analysis

Third Rare Earth Conference, Clearwater, Fla., Apr 63

HW-SA-2663
Hanford Atomic Products Operation, Richland, Wash.
DETERMINATION OF NITROGEN AS URANIUM NITRIDES IN FUSED URANIUM DIOXIDE (UO_2)
Harlan J. Anderson and James C. Langford. 12 Jul 62, 8p
Contract AT(45-1)1350
OTS $1.10

DESCRIPTORS: *Uranium, *Oxides, *Nitrogen, Determination

HW-SA-2632
Hanford Atomic Products Operation, Richland, Wash.
THE DISTRIBUTION OF BISMUTH(III) AND POLONIUM(IV) BETWEEN HYDROCHLORIC ACID AND TRILAURYLAMINE SOLUTIONS
J. C. Sheppard and R. Warnock (San Diego State Coll.
7 Jun 62, 14p
Contract AT(45-1)1350
OTS $1.60

DESCRIPTORS: *Bismuth, *Polonium,

HW-SA-2645
Hanford Atomic Products Operation, Richland, Wash.
THE ELECTROLYTIC PREPARATION OF SINGLE CRYSTALS OF URANIUM DIOXIDE
F. A. Scott and L. K. Mudge. 18 Jun 62, 16p
Contract AT(45-1)1350
OTS $1.60

DESCRIPTORS: *Uranium, *Oxides, *Crystals, *Electrodeposition

TID-15807
[IIT Research Inst.,] Chicago, Ill.
DISINTEGRATION OF PELLETS IN OCEAN WATER
John F. Bitten and Jan Rosinski. [28 May 62] 28p
OTS $2.60

DESCRIPTORS: *Sea water, *Potassium, *Permanganates, Iron, Sulfates, Chlorides

TID-19265
Kansas State Univ., Manhattan.
REACTIONS OF ENERGETIC HYDROGEN ATOMS WITH SOLID FILMS OF PROPENE AT 77° K
Han Bo Yun and Herbert C. Moser. [1962] 11p
Contract AT(11-1)584
OTS $1.60

DESCRIPTORS: *Hydrogen, *Propenes.

UCRL-10344
Lawrence Radiation Lab., Univ. of California, Berkeley.
CRYSTAL STRUCTURE OF EUROPIUM TUNGSTATE
David H. Templeton and Allan Zalkin. 5 Jun 62, 20p
Contract W7405-eng-48
OTS $1.60

UCRL-10332
Lawrence Radiation Lab., Univ. of California, Berkeley.
A 41 KILOBARS TRANSITION IN YTTERBIUM
Harold Stromberg and George Jura. Jul 62, 5p
Contract W7405-eng-48
OTS $1.10

DESCRIPTORS: *Ytterbium, Phase studies.

UCRL-10403
Lawrence Radiation Lab., Univ. of California, Berkeley.
ISOTROPIC HYPERFINE ENERGY OF INTERACTION OF FREE RADICALS IN SOLUTION
J. V. Acrivos. Aug 62, 5p
Contract W7405-eng-48
OTS $1.10

DESCRIPTORS: *Free radicals, *Liquids, Hyperfine structure.

UCRL-11124
Lawrence Radiation Lab., Univ. of California, Berkeley.
VAPOR PRESSURE AND HEAT OF SUBLIMATION OF BARIUM FLUORIDE
Patrick E. Hart. Master's thesis. 16 Jan 64, 20p
Contract W7405-eng-48
OTS $0.50

DESCRIPTORS: *Barium compounds, *Fluorides, Vapor pressure, Heat of sublimation

UCRL-7618
Lawrence Radiation Lab., Univ. of California, Livermore.
A MANOMETRIC METHOD FOR THE DETERMINATION OF OXYGEN IN ORGANIC COMPOUNDS
Jack W. Frazer. 17 Dec 63, 12p
Contract W7405-eng-48
OTS $0.50

DESCRIPTORS: *Organic compounds, *Oxygen, Determination.

UCRL-6953
Lawrence Radiation Lab., Univ. of California, Livermore.
THE PAPER CHROMATOGRAPHY OF SUBSTITUTED TRINTROBENZENES
David M. Colman. 31 May 62, 12p
Contract W7405-eng-48
OTS $1.60

LADC-5357
Los Alamos Scientific Lab., N. Mex.
THE CRYSTAL STRUCTURE OF α-HMX AND A REFINEMENT OF THE STRUCTURE OF β-HMX
Howard H. Cady, Allen C. Larson, and Don T. Cromer. [22 Aug 62] 25p
Contract W7405-eng-36
OTS $2.60

LADC-5411
Los Alamos Scientific Lab., N. Mex.
FLOW OF LIQUID He II UNDER LARGE TEMPERATURE AND PRESSURE GRADIENTS
P. P. Craig, W.E. Keller, and E. F. Hammel, Jr. [21 Aug 62] 53p
Contract W7405-eng-36
OTS $5.60

DESCRIPTORS: *Liquefied gases, Gas flow, *Helium,

LA-3035
Los Alamos Scientific Lab., N. Mex.
THE GRAVIMETRIC DETERMINATION OF TRACE AMOUNTS OF CARBON IN SODIUM METAL
Ross D. Gardner and William H. Ashley. Jan 64, 13p
Contract W7405-eng-36
OTS $0.50

LADC-5375
Los Alamos Scientific Lab., N. Mex.
AN INFRA-RED STUDY OF $[Ni(CN)_5]^{3-}$, $[Ni(CN)_6]^{4-}$, AND $[Ni(CN)_5Cl]^{4-}$ IN AQUEOUS SOLUTION
R. A. Penneman, Ralph Bain, George Gilbert, L. H. Jones, and R. S. Nyholm. 1962. 29p
Contract W7405-eng-36
OTS $2.60

LADC-5377
Los Alamos Scientific Lab., N. Mex.
THE PROCESSING OF PLUTONIUM BY ION-EXCHANGE I: THE CONCENTRATION DEPENDENCE OF DISTRIBUTION COEFFICIENTS OF DOWEX 1X4 FROM 7M NITRIC ACID
D. B. James. [1961] 21p
Contract W7405-eng-36
OTS $2.60

DESCRIPTORS: *Plutonium, *Ions, *Ion exchange

LADC-5128
Los Alamos Scientific Lab., N. Mex.
THERMIONIC EMISSION CHARACTERISTICS OF CERTAIN ACTINIDE COMPOUNDS
F. P. Cranston, Jr. and J. W. Barger. [21 Aug 62] 17p
Contract W7405-eng-36
OTS $1.60

DESCRIPTORS: *Actinide series compounds, *Thermionic emission.

NYO-10552
Massachusetts Inst. of Tech., Cambridge
THE CRYSTAL AND MOLECULAR STRUCTURE OF BIS-(DIPIVALOYLMETHANIDO) ZINC (II)
F. A. Cotton and J. S. Wood. 9 Aug 63, 24p
Contract AT(30-1)1965
OTS $2.60

DESCRIPTORS: *Zinc, *Complex compounds, *Molecular structure

TID-16744
Michigan Univ., Ann Arbor.
THERMOPHYSICAL PROPERTIES OF THE LANTHANIDE OXIDES. III. HEAT CAPACITIES, THERMODYNAMIC PROPERTIES AND SOME ENERGY LEVELS OF DYSPROSIUM(III), HOLMIUM(III), AND ERBIUM(III) OXIDES
Edgar F. Westrum, Jr. and Bruce H. Justice. 1962, 32p
Contract AT(11-1)1149
OTS $3.60

DESCRIPTORS: *Dysprosium, *Erbium, *Hoimium, *Oxides, Thermodynamics

TID-19229
National Bureau of Standards, Washington, D. C.
NOBLE GAS SOLUBILITY AND DIFFUSION IN UO_2.
Progress rept. for 1 Sep 62-30 Jun 63
S. Hasko and R. Szwarc. 6 Aug 63, 8p
Contract AT(49-2)1165
OTS $1.10

DESCRIPTORS: *Helium, Sorption, *Uranium, *Oxides, *Crystals

ORNL-TM-358
Oak Ridge National Lab., Tenn.
A MATHEMATICAL MODEL FOR THE SOLVENT EXTRACTION OF URANYL NITRATE AND NITRIC ACID
M. H. Lietzke and R. W. Stoughton. 10 Jul 62, 26p
Contract W7405-eng-26
OTS $2.60

DESCRIPTORS: *Nitric acid, *Solvent extraction, *Uranyl radicals, *Nitrates, Mathematical models.

ORNL-TM-635
Oak Ridge National Lab., Tenn.
SYNTHESES OF TWO TETRAHEDRAL NICKEL COMPOUNDS
H. L. Holsopple. 26 Jul 63, 5p
Contract W7405-eng-26
OTS $1.10

DESCRIPTORS: *Nickel compounds, Synthesis (Chemistry)

CONF-20-5
Pennsylvania State Univ., University Park.
MASS SPECTROMETRIC STUDY OF THE VAPORIZATION OF PRASEODYMIUM. GROUP V COMPOUNDS
K. A. Gingerich and J. Efimenko (National Bureau of Standards, Washington, D. C.) [1962] 8p
Contract AT(30-1)2541
OTS $1.10

DESCRIPTORS: *Praseodymium, *Group V elements, *Vaporization

Third Rare Earth Conference, Clearwater, Fla., Apr 63

CONF-20-22
Rensselaer Polytechnic Inst., Troy, N. Y.
ELECTROCHEMICAL CHARACTERISTICS OF THE RARE EARTH AND YTTRIUM METALS IN PHOSPHORIC ACID
Norbert T. Greene and Linda Lee. [1963] 14p
Contract AT(30-1)1995
OTS $1.60

DESCRIPTORS: *Rare earths, *Yttrium, *Electrochemistry.

Third Rare Earth Conference, Clearwater, Fla., Apr 63

SC-4972(RR)
Sandia Corp., Albuquerque, N. Mex.
THE OXIDATION OF U(IV) BY T1(III) OVER AN EXTENDED CONCENTRATION RANGE IN AQUEOUS-PERCHLORIC ACID SOLUTIONS
James O. Wear. Jan 64, 28p
Contract AT(29-1)789
OTS $0.75

DESCRIPTORS: *Thallium, *Uranium, *Oxidation.

TID-16387
Savannah River Lab., Aiken, S. C.
USE OF SULFAMIC ACID FOR DISSOLVING PLUTONIUM
W. J. Jenkins. [16 Aug 62] 3p
Contract AT(07-2)1
OTS $1.10

DESCRIPTORS: *Plutonium, *Sulfamic acids, *Nitric acid, Solvent action

Organic Chemistry

AD-423 556
Coating and Chemical Lab., Aberdeen Proving Ground, Md.
DEVELOPED DETERGENCY FUNCTION. Progress rept.
A. Mankowich. 31 Oct 63, 15p
CCL rept. no. 149; N64-12364
OTS $0.50

DESCRIPTORS: *Cleaning compounds, *Surface-active substances, *Fatty acids, Alcohols, Amines, Solubility.

The detergency (D) - solubilization (S), K_1, and K_2 functions for six additional series of soil-surfactant systems are derived ($D = K_1 S + K_2$). Examination of these intra-series K_1 and K_2 relationships together with those of the six series previously reported (AD-293 220) shows most are either the parabolic or trigonometric type. The saturated 18-C fatty acid is more difficult to deterge by the 20 - 50R adducts of nonylphenol (R = ethylene oxide mole ratio) than the one or two double bond 18-C acids. Apparently the double bond tends to prevent the close packing of the hydrocarbon chains which contributes to the binding energy of the acid soils. Detergent efficiency of the 20R and 30R nonyl phenol adducts increases with increasing chain length of the 12-18C alkylamines. It is suggested that detergency (desorption) is not solely determined by the vander Waals forces between the hydrocarbon chains of the soil adsorbate (the actions of micellar solubilization and suspendibility are involved also). Based on the detersive efficiencies of the 20-50R adducts of nonyl phenol, the adsorption of the several classes of soil investigated was in the following increasing order: alcohol, amine, acid. (Author)

AD-419 686
Olin Mathieson Chemical Corp., New Haven, Conn.
A NEW SERIES OF ORGANOBORANES. II. CARBORANES FROM THE REACTION OF DECABORANE WITH ACETYLENIC COMPOUNDS.
Technical rept. no. 15
T. L. Heying, J. W. Ager, Jr., S. L. Clark, D. J. Mangold, and H. L. Goldstein. Jun 63, 20p
Contract Nonr-3395(00)
OTS $1.60

DESCRIPTORS: *Organoboranes, Synthesis (Chemistry), *Decaboranes, *Alkynes, Nitriles, Amides, Solvents.

The reactions of decaborane, and several of its derivatives, with alkynes were investigated employing a variety of conditions. A new compound, 11, 12-dicarbadodecacarborane-12 ($B_{10}C_2H_{12}$), was obtained by refluxing bis(acetonitrile)decaborane with acetylene in benzene. Efforts were directed toward the determination of conditions influencing high yields of carboranes. The following carboranes were synthesized: methyl-; vinyl-; isopropenyl-; n-butyl-; n-propyl-; n-hexyl-; γ-methylbutyl-; phenyl-; B-ethyl-; bromomethyl-; bis-chloromethyl-; acetoxymethly-; C-bromo-C-n-propyl-; C-bromo-C'-n-butyl-; β-acetoxyethyl-; α-acetoxyethyl-; N,N-dimethylaminomethiyl-; bis(acetoxymethyl-). Also: 1,3-dicarboranyl propane; methyl carboranecarboxylate; dimethyl carboranedicarboxylate. (See also AD-403 376)

Physical Chemistry

NASA-TN-D-2258
Goddard Space Flight Center, National Aeronautics and Space Administration, Greenbelt, Md.
PROPOSED MECHANISM FOR THERMOPHOTOTROPIC BEHAVIOR IN PEROVSKITE-STRUCTURED TITANATES
Stanley M. Neuder. Mar 64, 17p
N64-17296
OTS $0.50

DESCRIPTORS: *Photochemistry, *Colorimetry, Alkaline earth compounds, *Titanates

PB-165 292
Naval Ordnance Lab., White Oak, Md.
PRELIMINARY DATA ON ABSORPTION SPECTRA AND EQUILIBRIA INVOLVING NITROFORM
David Luckey. 1 Sep 50, declassified 27 Oct 61, 20p
NAVORD rept. 1717
OTS $1.60

DESCRIPTORS: *Explosive materials, *Nitrogen compounds, Methanes, Absorption spectrum, Chemical equilibrium, Dissociation.

It is shown that nitroform ion concentrations between 10^{-2} and 10^{-5} moles per liter can be measured readily and without interference by light absorption by covalent nitro compounds. The following preliminary data were secured in this way: (1) the dissociation constant of nitroform in water 3.0 ± 0.5. The dissociation constant of nitroform in methanol, $1.5 \pm 0.1 \times 10^{-4}$; (2) the enthalpy change on the dissociation of nitroform in water, 3.1 ± 0.5 Kg cal/mole; (3) the equilibrium constant for the dissociation of 2,2,2-trinitroethanol into nitroform and formaldehyde in aqueous solutions, $K = 1.4 \pm 0.4 \times 10^{-5}$; (4) some data on the behavior of bis(trinitroethyl)urea are given whose interpretation is uncertain. (Author)

EARTH SCIENCES

Climatology and Meteorology

N64-16755
High Altitude Engineering Lab., Univ. of Michigan, Ann Arbor.
ERRORS IN ATMOSPHERIC TEMPERATURE STRUCTURE SOLUTIONS FROM REMOTE RADIOMETRIC MEASUREMENTS. Technical rept.
S. Roland Drayson. Dec 63, 30p
Contract NASr-54(03)
Rept. 05863-4-T; NASA CR-53120
OTS $2.60

DESCRIPTORS: *Atmospheric temperature, *Infrared radiation, Measurement, Radiometers, Statistical functions, Least squares method, Numerical analysis.

N64-16743
High Altitude Engineering Lab., Univ. of Michigan, Ann Arbor.
LONG-TERM INTEGRITY OF THE TIROS 5-CHANNEL RADIOMETER VISIBLE CHANNEL CHARACTERISTICS. Technical rept.
F. L. Bartman, M. T. Surh, and M. G. Whybra.
Dec 63, 41p
Contract NASw-140
Rept. 03615-13-1; NASA CR-53105
OTS $4.60

DESCRIPTORS: Meteorological satellites, Instrumentation, *Radiometers, Calibration,

N64-16705
Stanford Research Inst., Menlo Park, Calif.
MEDIUM RESOLUTION INFRARED (MRIR) AND HIGH RESOLUTION INFRARED (HRIR) DATA PROCESSING AND CONVERSION. Technical rept. 2
H. Frohbach, R. M. Madvig, R. L. Mancuso, and M. Pollack. Oct 63, 98p
Contract NAS5-1882
SRI proj. 3927; NASA CR-55901
OTS $8.60

DESCRIPTORS: *Meteorological satellites, Radiometers, *Infrared radiation, Measurement, *Data processing systems, Digital computers.

AD-426 772
Woods Hole Oceanographic Institution, Mass.
RESEARCH IN MARINE METEOROLOGY. Final technical rept. 1 Feb 55-31 Mar 63
Andrew F. Bunker. Dec 63, 14p
Contract Nonr 1721(00)
Reference no. 63-43
OTS $1.60

DESCRIPTORS: *Marine meteorology, *Meteorological parameters, Clouds, Convection, Wind, Infrared radiation, Turbulence,

Topics include: studies of the thermal and humidity structure of the trade winds; studies of cumulus convection; cloud distribution studies; dyanmics and energy relations; turbulence and turbulent transport of energy; an infra-red radiation studies. (See also AD-262 721).

Oceanography

PB-165 277
Texas A. & M. Univ., College Station.
PRIMARY PRODUCTION AND STANDING CROP OF PHYTOPLANKTON ALONG THE ARGENTINE COAST, DRAKE PASSAGE AND BRANSFIELD STRAIT.
Annual rept., 1 Nov 62-31 Nov 63
Sayed Z. El-Sayed. 12 Mar 64, 82p
Grant NSF G21444
OTS $8.10

DESCRIPTORS: *Marine biology, *Plankton, *Plants (Biology), Aquatic animals, *Sea water, *Marine meteorology, *Chlorophylls, *Atlantic Ocean, Argentina, Oceanolographic data.

Measurements were made of primary production and standing crop of the phytoplankton and regional and seasonal variations in productivity were determined along the Argentine Coast, in the Drake Passage and the Bransfield Strait. Studies were also made of the species composition of the phytoplankton and zooplankton populations at the stations where productivity measurements were made. The report includes the following: presentation of the data taken during Cruise IV; study of the species composition of the phytoplankton samples collected during Cruise III; preprint of a paper entitled "Primary Organic Production in the Drake Passage and Bransfield Strait (Southern Ocean)"; a note on "Diurnl Variations in Productivity in Sub-Antarctic Waters." (See also PB-163 452)

Physics of the Atmosphere

NASA-CR-29
Michigan Univ., Ann Arbor.
THE MEASUREMENT OF UPPER-AIR DENSITY AND TEMPERATURE BY TWO RADAR-TRACKED FALLING SPHERES
J. W. Peterson and K. D. McWatters. Apr 64, 49p
Contract NASw-138
N64-17831
OTS $1.50

PB-163 540
Research and Advanced Development Div., Avco Corp., Wilmington, Mass.
SPORADIC E IN ANTARCTIC DURING THE INTERNATIONAL GEOPHYSICAL YEAR. Scientific rept. 7, on Antarctic Research and Data Analysis
Thomas M. Noel. 30 Jul 63, 34p
Contract NSF-C255
Technical rept. RAD-TR-63-29
OTS $3.60

DESCRIPTORS: *Ionosphere, *Antarctic regions, Electron density, *Meteorological phenomena, *Geophysics, Terrestrial magnetism, Aurorae, Atmospherics, Periodic variations.

Intense sporadic E (foEs >5mc) in the Antarctic, based on monthly statistics, has seasonal, diurnal, and latitudinal variations during the IGY which are much the same as those found at high latitudes in the northern hemisphere. The diurnal variation of occurrence has secondary (in addition to primary) maxima which reflect (except at very high geomagnetic latitudes) the influence of the dominant temporal variation at a latitude farther north or south. A synoptic view (again based on monthly statistics) indicates that, during summer and winter, maxima in the spatial pattern of intense Es are located in the vicinity of Pole Station, Byrd, and Little America, and in the vicinity of Mirny and Wilkes; and a minimum in the vicinity of Vostok, Scott Base, Cape Hallett, and Terre Adelie. Periodicity in foEs (instantaneous values) on the order of a few hours during occurrences of intense Es suggests a model for high-latitude Es ionization based upon groups of electrons drifting longitudinally around the Earth more than once. The periods noted at Little America and Wilkes correspond to electron energies which have been associated with the production of Es. (Author)

ENGINEERING

WAPD-T-1482
Bettis Atomic Power Lab., Pittsburgh, Pa.
INTERPRETIVE REPORT OF PRESSURE VESSEL RESEARCH
B. F. Langer. Feb 62, corrected Jun 62, 38p
Contract AT(11-1)GEN-14
OTS $3.60

DESCRIPTORS: *Pressure vessels, *Tensile properties

TID-16258
Knolls Atomic Power Lab., Schenectady, N. Y.
CUMULATIVE FATIGUE DAMAGE WITH PROGRESSIVE LOADING
R. R. Gatts. 16 Jul 62, 21p
Contract W31-109-eng-52
OTS $2.60

DESCRIPTORS: *Fatigue (Mechanics)

NASA-TN-D-2200
Langley Research Center, National Aeronautics and Space Administration, Langley Station, Va.
BENDING TESTS OF LARGE-DIAMETER STIFFENED CYLINDERS SUSCEPTIBLE TO GENERAL INSTABILITY
Michael F. Card. Apr 64, 32p
N64-17772
OTS $0.75

Aeronautical Engineering

PB-165 305
Air Force Flight Test Center, Edwards AFB, Calif.
HU-1 STABILITY AND CONTROL EVALUATION
Juan M. Calderon and Paul J. Balfe. Dec 60, 153p
AFFTC-TR-60-57; AD-252 163
OTS $11.50

DESCRIPTORS: *Helicopters, Stability, Control, Tests, Flight testing, Vibration, Cockpits, Design, Transport planes, Training planes.

An evaluation was made of the HU-1 helicopter to determine its stability and control characteristics. The aircraft is a single rotor utility type helicopter. It is powered by a Lycoming T53-L-1B free turbine engine limited to 770 horsepower at 6400 rpm. The design gross weight of the HU-1 is 5725 pounds. The design mission of this helicopter includes the transport of personnel and equipment, instrument training, medical evacuation, and general utility operations. The principa deficiencies of the HU-1 include wallowing while hovering in ground effect, a persistent lateral-directional osciallation in forward flight, and excessive vibration levels at the higher airspeeds. Outstanding characteristics of the aircraft include excellent dynamic longitudinal stability, strong static directional stability, excellent sideward and rearward flight capabilities, good controllability and good cockpit design. (Author)

NASA-TN-D-2231
Ames Research Center, National Aeronautics and Space Administration, Moffett Field, Calif.
A FLIGHT INVESTIGATION OF THE PERFORMANCE HANDLING QUALITIES AND OPERATIONAL CHARACTERISTICS OF A DEFLECTED SLIPSTREAM STOL TRANSPORT AIRPLANE HAVING FOUR INTERCONNECTED PROPELLERS
Hervey C. Quigley, Robert C. Innis, and Curt A. Holzhauser. Mar 64, 62p
N64-17726
OTS $1.50

PB-165 244
Battelle Memorial Inst., Columbus, Ohio.
STUDY AND ANALYSIS OF FACTORS AFFECTING FATIGUE STRENGTH OF ROTOR-BLADE-RETENTION ASSEMBLIES
Alexander A. Mittenbergs, Frederick F. Fondriest, and Horace J. Grover. Mar 59, 137p
Contract AF33(616)3799
WADC Technical rept. 59-170; AD-212 577
OTS $10.50

DESCRIPTORS: *Rotor blades (Rotary wings), *Helicopter rotors, *Fastenings, *Fittings, Tensile properties, Loading (Mechanics), Fatigue (Mechanics), Geometric forms.

A study and evaluation of current practices in the design and evaluation of rotor-blade-retention assemblies was made, followed by an experimental program investigating mainly the effects of geometric variables on the fatigue strength of lug-type steel fittings. The test specimens were subjected to a steady tension load, simulating the centrifugal force on the fitting, and an alternating-bending moment, simulating the flapwise or chordwise bending. The geometric parameters investigated were the ratios of: (1) clevis-lug-thickness to lever thickness, (2) pin diameter to lug width, (3) lever thickness to lug width, and (4) throat depth to lug width. Also briefly investigated were the effects of high pin interference and a high clamping force. The results were encouraging. Investigations of geometric parameters in most cases indicated optimum values for the ratios to give maximum moment-carrying capacity under the above fatigue loading. The investigations at high pin interference and at a high clamping force indicated considerable improvement in fatigue strength of the simulated retention fittings. (Author)

NASA-TN-D-2265
Flight Research Center, National Aeronautics and Space Administration, Edwards, Calif.
FLIGHT EVALUATION OF WIDE-ANGLE OVERLAPPING MONOCULARS FOR PROVIDING PILOT'S FIELD OF VISION
Paul L. Chenoweth and William H. Dana. Apr 64, 17p
N64-17753
OTS $0.50

NASA-TN-D-2271
Langley Research Center, National Aeronautics and Space Administration, Langley Station, Va.
LOW-SPEED FREE-FLIGHT STABILITY AND DRAG CHARACTERISTICS OF RADIALLY VENTED PARACHUTES
Sanger M. Burk, Jr. Mar 64, 17p
N64-17729
OTS $0.50

NASA-TM-X-952
Langley Research Center, National Aeronautics and Space Administration, Langley Station, Va.
A TABULATION OF HELICOPTER ROTOR-BLADE DIFFERENTIAL PRESSURES, STRESSES, AND MOTIONS AS MEASURED IN FLIGHT
James Scheiman. Mar 64, 693p
N64-17832
OTS $8.00

NASA-TN-D-2179
Langley Research Center, National Aeronautics and Space Administration, Langley Station, Va.
WIND-TUNNEL FLUTTER STUDIES OF THE SWEPT-BACK T-TAIL OF A LARGE MULTIJET CARGO AIRPLANE AT MACH NUMBERS TO 0.90
Charles L. Rublin, Maynard C. Sandford, and E. Carson Yates, Jr. Mar 64, 61p
N64-17725
OTS $1.50

PB-165 308
Propulsion Lab. [Aeronautical Systems Div.] Wright-Patterson AFB, Ohio
HELICOPTER ROTOR BLADE ICING (SUMMARY OF EFFORT). Final rept., 18 Apr 58-29 Mar 60, on Helicopter Rotor Technology
George D. Coyle. May 60, 15p
WADD Technical rept. 60-241; AD-239 962
OTS $1.60

DESCRIPTORS: *Rotor blades (Rotary wing), *Helicopter rotors, Trajectories, Aerodynamic characteristics, Gases, Heating, Electric currents, De-icing materials, *De-icing systems,

Helicopter rotor blades, susceptible to dangerous and rapid ice accumulation, must be protected against ice by some type of ice-control system. This report summarizes the following investigations and programs to establish basic design criteria: Theoretical studies of trajectories for icing interception; effects of ice on aerodynamic characteristics of helicopters; and use of heated air and electrical energy for ice-control. Fluid ice-control systems, though not part of program, are discussed briefly. Suitable ice control can be accomplished with heated air or gases, electrical energy, or fluids provided the rotor blades are designed to be compatible with the specific ice-control system. (Author)

Chemical Engineering

TID-19235
Johns Hopkins Univ., Baltimore, Md.
VAPOR CONDENSATION IN THE MIXING ZONE OF A JET
George M. Hidy and S. K. Friedlander. Feb 63, 64p
Contract AT(30-1)2165
OTS $6.60

DESCRIPTORS: *Jets, *Condensation, Gases

ORNL-TM-598
Oak Ridge National Lab., Tenn.
A STUDY OF THE ELECTRODELESS ELECTROLYTIC DISSOLUTION OF STAINLESS STEEL IN NITRIC ACID USING A MAGNETICALLY INDUCED POTENTIAL
C. A. Erdman and C. V. Chester. 3 Sep 63, 26p
Contract W7405-eng-26
OTS $2.60

DESCRIPTORS: *Stainless steel.

ORNL-TM-541
Oak Ridge National Lab., Tenn.
UNIT OPERATIONS SECTION MONTHLY PROGRESS REPORT, JANUARY 1963
M. E. Whatley, P. A. Haas, R. W. Horton, A. D. Ryon, and J. C. Suddath. 12 Aug 63, 84p
Contract W7405-eng-26
OTS $8.10

DESCRIPTORS: *Reactor fuel elements

CONF-124-1
Texas Nuclear Corp., Austin.
THE APPLICATION OF NUCLEAR TECHNIQUES IN COAL ANALYSIS
Troy C. Martin, Suresh C. Mathur, and Ira L. Morgan. [1963] 43p
Contract AT(40-1)2980
OTS $4.60

DESCRIPTORS: *Coal, Analysis, Carbon, Oxygen, Aluminum, Silicon, *Nuclear industrial applications

Symposium on the Application of Advanced Technology to Coal Research, Lexington, Ky., Jun 63

Civil Engineering

UCRL-7657
Lawrence Radiation Lab., Univ. of California, Livermore.
ENGINEERING PROPERTIES AND APPLICATIONS OF NUCLEAR EXCAVATIONS
Louis J. Circeo, Jr. 5 Feb 64, 47p
Contract W7405-eng-48
OTS $1.25

SC-4929(RR)
Sandia Lab., Albuquerque, N. Mex.
CONSTRUCTION OF A SEA-LEVEL, TRANSISTHMIAN CANAL USING NUCLEAR EXPLOSIVES
L. J. Vortman, Feb 64, 75p
OTS $2.00

Electrical and Electronic Engineering

N64-16110
Alabama Univ. Research Inst., Huntsville.
WAVEGUIDE WITH ARBITRARY CROSS-SECTION CONSIDERED BY CONFORMAL MAPPING
F. J. Tischer and H. Y. Yee. Jan 64, 22p
Grant NsG-381
UARI Research rept., no. 12; NASA CR-55509
OTS $2.60

DESCRIPTORS: *Waveguides, Geometric forms, Transformations (Mathematics), *Conformal mapping, Wave transmission, Equations, Numerical analysis.

N64-16747
Allison Div., General Motors Corp., Indianapolis, Ind.
DEVELOPMENT AND TESTING OF ELECTROLYTE MATRIX COMBINATIONS FOR MERCURY-POTASSIUM FUEL CELL. Final rept.
V. L. Decker, R. A. Murie, and W. S. Colwell. Jan 64, 132p
Contract NASw-476
Engineering dept. rept. no. 3709; NASA CR-53108
OTS $10.50

DESCRIPTORS: Liquid metals, Mercury, Potassium, *Fuel cells, *Electrolytes, Test methods.

NASA-TN-D-2132
Ames Research Center, National Aeronautics and Space Administration, Moffett Field, Calif.
ON THE EQUILIBRIUM SONIC-FLOW METHOD FOR EVALUATING ELECTRIC-ARC AIR HEATER PERFORMANCE
Warren Winovich. Mar 64, 36p
N64-17154
OTS $1.00

DESCRIPTORS: *Gas flow, *Exhaust nozzles, *Electric arcs, *Heaters, Enthalpy, Measurement, Effectiveness

AD-429 924 repriced
[Army] Frankford Arsenal, Philadelphia, Pa.
DESIGN STUDY OF SELF-CALIBRATING ELECTRICAL MEASUREMENT SYSTEM
M. Mondress, R. S. Zelenka, and A. Hoffman. Dec 63, 77p
Memo. rept. no. M64-19-1
OTS $2.00

DESCRIPTORS: *Measuring devices (Electrical and electronic), *Test sets, Calibration, Automatic, Resistance (Electrical), Voltage, Capacitance, Circuits.

A fully automated self-calibrating electrical measurement test set for field use is proposed. The key features of the system are: (1) a set of converters for reducing all measurements to quantities involving the basic three parameters (voltage, resistance and time); (2) direct electrical measurement capability, reducing the number of measurement devices in the field; (3) computational capability for the solution of measurement network equations and the performance of error analysis; (4) full automatic execution of stored program calibration procedures and measurement routines; (5) self-check philosophy to insure fidelity of the system at

all times; (6) minimal standards package consisting of single standards of resistance, voltage and time. The standards package is replaceable on a periodic basis. The system is described on a technical basis after which a proposal for the fabrication of a prototype model is presented. (Author)

AD-426 776 repriced
Astronuclear Lab., Westinghouse Electric Corp., Pittsburgh, Pa.
SUPERCONDUCTING MAGNET RESEARCH AND APPLICATION TO MHD POWER GENERATORS. Final rept., 1 Feb-31 Oct 63
R. R. Akers, W. A. Stewart, T.C. Tsu, R. E. Kothman, and O. T. Beecher. 31 Dec 63, 368p
Contract AF33(657)10567
RTD-TDR-63-4170; N64-13657
OTS $5.00

DESCRIPTORS: *Electromagnets, Superconductors, *Magnetohydrodynamics, *Generators, Superconductivity, Auxiliary power plants, Spacecraft, Feasibility studies,

This report covers a theoretical study of the application of large superconducting magnets to MHD generators used for space power generation. The study determines the need for superconducting magnets in lieu of conventional magnets for this application. A suitable superconducting magnet-MHD generator system is developed which includes the solution of the following problems: winding configuration, field strength and field variations, stress and magnetic force support structures, heat rejection radiators, cryogenic and high temperature cooling, stored helium cooling, refrigeration and insulation, superconductor properties, magnet protection, and losses in the MHD process due to field strength and field variations. Optimum techniques and parameters are investigated for all components. (Author)

PB-165 275
Boeing Co., Seattle, Wash.
DESIGN CRITERIA FOR BURIED ANTENNAS
A. W. Guy and G. Hasserjian. 13 Sep 62, 267p
Rept. no. D2-7760
OTS $17.00

DESCRIPTORS: Antennas, *Underground antennas, Theory, Weapon systems, Operation, Design, Effectiveness, Numerical analysis.

This report contains the results of a study to determine the feasibility and design criteria for the operation of buried antennas. The study was motivated by the requirement of a reliable hardened communication system to be used with underground missile squadrons. The study resulted in the selection of buried antenna systems with the maximum efficiency and most favorable imput impedance and provided generalized design criteria for predicting the performance of the antenna over a wide range of frequencies and environmental conditions. (Author)

PB-165 274
Boeing Co., Seattle, Wash.
EXPERIMENTAL DATA ON BURIED ANTENNAS
A. W. Guy. 2 Jan 62, 130p
Contract 5-78105-7670-54013
Rept. no. D2-90051
OTS $10.10

DESCRIPTORS: Antennas, *Underground antennas, Test facilities, Salts, Water, Weapon systems, Electrical properties, Tests.

This report contains a discussion of controlled experiments performed on insulated wire antennas buried in a semi-infinite conducting medium. The latter is approximated by salt water tanks and other larger salt water facilities. These experiments were performed to verify and supplement the theoretical approximations discussed in Boeing Document (PB-165 275). First, a discussion of the various salt water facilities and the measurement techniques are presented. The measurements include: Field strength input impedance, current distribution and mutual coupling of various antenna configurations. Then the results of extensive measurements are presented and compared with the theoretical approximations of the document referred to above. In the case of mutual coupling between antenna arrays near the surface, for which theoretical approximations were not obtained, empirical results are derived from the experimental measurements. Limitations and further extensions of these experiments are discussed in the final section of this report. (Author)

AD-421 049
Calvin Coll., Grand Rapids, Mich.
SILVER MIGARTION AND TRANSPORT MECHANISM STUDIES IN SILVER OXIDE-ZINC BATTERIES. Final rept.
T. P. Dirkse. Sep 63, 53p
Contract AF33(657)8689
ASD-TDR-63-863
OTS $1.50

DESCRIPTORS: *Batteries and components, *Alkaline cells, Transport properties, *Silver, Diffusion, Tracer studies, Silver compounds, Oxides, Zinc, *Battery separators, Permeability,

A study was made of the methods by which silver is transported from the silver electrodes in silver-alkaline batteries. This study was made using radioactive silver tracers as well as by straight analytical techniques. This transport is due primarily to diffusion. Various kinds of separator materials were tested with respect to reactivity with dissolved silver oxides as well as with respect to effectiveness in preventing the transport of silver in a working silver-alkaline battery. Generally, effectiveness in preventing transport is due to reaction with the silver oxide dissolved in the potassium hydroxide electrolyte. Two screening tests were devised for testing the effectiveness of a given separator material in preventing the transport of silver. (Author) (See also AD-415 697)

PB-165 294
Clevite Corp., Cleveland, Ohio.
CERAMIC I-F TRANSFORMERS. Quarterly rept. no. 1, 1 Jun-31 Aug 60
D. R. Curran and D. J. Koneval. 30 Sep 60, 40p
Contract DA36-039-sc-85346
Rept. no. 16; AD-246 517
OTS $3.60

DESCRIPTORS: *Radiofrequency filters, *Band-pass filters, *Crystal filters, *Piezoelectric crystals, *Ceramic materials, *Resonators, Frequency, Temperature, Radiofrequency amplifiers, *Miniature electronic equipment, Transformers.

The range of symmetrical radial modes in piezoelectric ceramic disks was extended above 4 mc by the use of miniature 1st overtone resonators. Methods were developed to fabricate, electrode, and tune these resonators with reasonable results. A five resonator ladder filter with a pass-band centered at 4.6 mc was fabricated. Thickness resonant disks, dimensionally suited to micro-module packaging, were fabricated for use as series couplers in a 4.3 mc I.F. amplifier. The cross-coupling between thickness expander and higher overtone radial modes was studied in detail for these disks. Radial overtone frequencies were identified and compared with theory in a frequency range extending through the fundamental thickness resonance. Frequency-temperature measurements for thickness resonators were made on the commercial filter ceramic and related compositions. The slope of the frequency vs temperature curve was more positive for the thickness resonance than for the corresponding radial resonance in each. (Author)

PB-165 295
Clevite Corp., Cleveland, Ohio.
CERAMIC I-F TRANSFORMERS. Quarterly rept. no. 2, 1 Sep-30 Nov 60
D. R. Curran and D. J. Koneval. 30 Dec 60, 33p
Contract DA36-039-sc-85346
Rept. no. 17; AD-251 221
OTS $3.60

DESCRIPTORS: *Radiofrequency filters, *Band-pass filters, *Crystal filters, *Piezoelectric crystals, *Ceramic materials, *Resonators, Packaging, Miniature electronic equipment, Transformers.

Sources of spurious responses in thickness resonant disks (d/t from 9 to 15) were investigated experimentally and theoretically, and are attributed to both the symmetrical and asymmetrical radial overtone modes. Differential equations for the asymmetrical case were derived in separable form but have not yet been evaluated. Sample 4.3 mc thickness resonators were prepared for evaluation as series coupling elements in a specific I-F amplifier. Packaging methods are discussed. Improved fabrication techniques for 4 mc 1st overtone radial resonators and an initial packaging attempt are described. Dot-resonators, applied to ceramic wafers in the 10 mc range, and a Uni-Wafer ladder filter centered at 10.6 mc were fabricated. Parameters in wafer circuitry are discussed. (Author) (See also PB-165 294)

AD-426 882 repriced
General Atomic Div., General Dynamics Corp., San Diego, Calif.
HIGH TEMPERATURE VAPOR-FILLED THERMIONIC CONVERTER. Final technical rept., 15 Mar 62-15 Sep 63
R. Skoff. 3 Jan 64, 106p
Contract AF33(657)8563, continuation of Contract AF33(616)7422
Rept. no. GA-4012; RTD-TDR-63-4190; N64-13755
OTS $2.50

DESCRIPTORS: *Thermionic converters, Performance (Engineering), *Plasma sheath, Simulation, Uranium compounds, Zirconium compounds, Vaporization, Carbides, Thermionic emission, High-temperature research, Electric power production.

The operating characteristics of plasma converters utilizing bare uranium-zirconium carbide as the emitting surface were determined as a function of operational lifetime. The emitter design was cylindrical in a size representative of that expected in a space thermionic reactor. The electrode spacing varied from 0.040 in. early in the program to 0.012 in. An operational lifetime of 3000 hr was considered a resasonable goal. Electrically heated, as opposed to fission-heated, converters were selected as the most economical method of fulfilling these objectives. Six converters were operated for over 6000 hr at power levels of 10 to 40 w (1 to 4 w/sq cm) on a continuous-performance basis. A maximum power density of 6.8 w/sq cm was observed at an emitter temperature of 2245 K. The optimum Ce-reservoir temperature for all converters tested occurred at 605 to 630 K. Five of the 6 converters failed during operation owing to envelope leakage, resulting in the complete loss of cesium to the surrounding vacuum chamber. Despite the depletion of uranium from the bulk of the emitter, vacuum-emission currents measured pre- and post-test were nearly identical in magnitude. (Author)

N64-16762
Globe-Union, Inc., Milwaukee, Wis.
THE DEVELOPMENT OF HIGH ENERGY DENSITY PRIMARY BATTERIES, 200 WATT HOURS PER POUND OF TOTAL BATTERY WEIGHT MINIMUM. Quarterly rept. no. 2, 1 Nov 63-31 Jan 64
Warren L. Towle. [1964] 64p
Contract NAS3-2790
NASA CR-53111
OTS $6.60

DESCRIPTORS: *Batteries of components, *Primary cells, Electrolytes, Electrodes, Electrochemistry,

AD-425 878
Hamilton Standard Div., United Aircraft Corp., Windsor Locks, Conn.
ELECTRON BEAM TECHNIQUES FOR FABRICATION AND ASSEMBLY OF PARTS FOR ELECTRON TUBES. Quarterly rept. no. 1, 1 Jul-30 Sep 63
John F. Dudenhoefer. [1963] 69p
Contract DA36-039-AMC-03625 (E)
OTS $1.75

DESCRIPTORS: *Electron beams, *Electron tubes, Electronic equipment, Production, Manufacturing methods, *Electron tube parts.

The purposes of the program are outlined. The fundamentals of the electron beam process, including its advantages over more conventional techniques, are briefly discussed. Materials procured for developmental testing are listed. The configurations to be evaluated are presented; those configurations welded to date are tabulated. Evaluation procedures, where established, are presented. Progress in applying electron beam processing to electron tube fabrication is discussed. (Author)

AD-421 054
Hughes Research Labs., Malibu, Calif.
STUDY OF BOMBARDMENT-INDUCED CONDUCTIVITY MATERIALS [AND] FEASIBILITY OF A MESHLESS STORAGE TUBE. Final rept., 15 Jul 60-15 Jul 63
Norman H. Lehrer. Oct 63, 146p
Contracts AF33(657)7789 and AF33(616)7563
ASD-TDR-63-715
OTS $2.75

DESCRIPTORS: *Storage tubes, *Electron bombardment, Excitation, Electrical conductance, Thin films (Storage devices), Dielectrics, Display systems, Feasibility studies.

The objective of this work was a phenomenological study of materials which exhibit electron bombardment-induced conductivity (BIC) as well as sustained electron bombardment-induced conductivity (SEBIC) for application to novel display devices. These devices are (1) a direct-view storage tube with high resolution, selective erasure, and the ability to display stored and non-stored information simultaneously, and (2) a high resolution storage tube containing no meshes. The operation of the direct-view storage tube is reviewed and criteria are established for advantageous use of a BIC dielectric in direct-view storage tubes. The meshless storage tube operation is analyzed, and the required SEBIC material characteristics are established. The theory of bombardment-induced conductivity is defined and related to the materials requirements. (Author) (See also AD-296 166)

AD-429 135 repriced
Inland Testing Labs., Dayton, Ohio.
ALKALINE BATTERY EVALUATION. Semiannual rept. no. 6, 30 Jun 60-16 Sep 63, on Static Energy Conversion
W. W. Clark, W. G. Ingling, I. F. Luke, and E. A. Roeger, Jr. Dec 63, 377p
Contracts AF33(616)7529 and AF33(657)8450
RTD-TDR-63-4144, supersedes ASD-TDR-63-394, ASD-TDR-62-893, ASD-TDR-62-553, ASD-TDR-62-86, and ASD-TR-61-236; AD-411 245; N64-14962
OTS $5.00

DESCRIPTORS: *Batteries and components, *Alkaline cells, Spacecraft, *Storage batteries, Performance (Engineering) Tests, Silver, Cadmium, Zinc, Nickel, Failure (Mechanics),

This report covers the first six semi-annual periods of an alkaline battery applied research and failure analysis program. This program, to date, includes the cycle-life performance evaluation and failure analysis of the following types of sealed, secondary, alkaline cells: One type of 12-ampere-hour nickel-cadmium cells, and two types of 20-ampere-hour nickel-cadmium cells, three types of 15-ampere-hour silver-cadmium cells; and three types of 25-ampere-hour silver-zinc cells. The results of cycle-life tests on the 12-ampere-hour nickel-cadmium cells show that; (1) Cell cycle-life with shallow discharges is considerably longer than cycle-life at deep discharges and (2) Cycle-life is reduced by high and low ambient temperature. The results of cycle-life tests on the silver-oxide type cells, based upon the limited data from the incomplete tests, indicate the same general relation regarding cycle life with depth of discharge and temperature. Also, the silver-cadmium cells evaluated have a greater cycle life than the silver-zinc cells evaluated under corresponding test conditions. (Author)

NASA-TN-D-2119
Lewis Research Center, National Aeronautics and Space Administration, Cleveland, Ohio.
ONE-DIMENSIONAL HEAT-TRANSFER ANALYSIS OF THERMAL-ENERGY STORAGE FOR SOLAR DIRECT-ENERGY-CONVERSION SYSTEMS
Richard R. Cullom, William H. Robbins, and Carroll A. Todd. Mar 64, 28p
N64-17294
OTS $0.75

DESCRIPTORS: Solar radiation, *Thermionic converters, Auxiliary power plants, One-dimensional flow, *Heat transfer, Analysis, Energy conversion

NASA-TR-R-192
Lewis Research Center, National Aeronautics and Space Administration, Cleveland, Ohio
THERMAL AND THERMIONIC CHARACTERISTICS OF A LARGE-SCALE EXPERIMENTAL THERMIONIC CONVERTER
A. Vary. Mar 64, 38p
N64-17163
OTS $1.00

DESCRIPTORS: *Thermionic converters, Energy, conversion, Thermionic emission, Thermal properties, Electric power production, Design.

LADC-5418
Los Alamos Scientific Lab., N. Mex.
AN ELECTRICAL FLUX PUMP FOR POWERING SUPERCONDUCTING MAGNET COILS
Henry L. Laquer. [21 Aug 62] 11p
Contract W7405-eng-36
OTS $1.60

DESCRIPTORS: *Electromagnetic pumps, *Superconductors, *Magnet coils

AD-427 070 repriced
Mallory (P. R.) and Co., Inc., Burlington, Mass.
CELL EQUALIZATION TECHNIQUES. Final rept.
Peter J. Whoriskey. Dec 63, 36p
Contract AF33(657)8749
RTD-TDR-63-4187
OTS $1.00

DESCRIPTORS: *Solar cells, *Storage batteries, *Alkaline cells, Nickel, Cadmium, Diodes (Semiconductor), Germanium, Life expectancy, Silicon, Silver, Zinc, Electric discharges, Batteries and components.

The power supply of space vehicles consists of certain types of hermetically sealed alkaline battery cells coupled with solar cells. During usage these alkaline battery cells, series connected, are repeatedly subjected to charge-discharge cycles that can eventually produce cell failure. These failures are, in turn, attributable to inherent cell differences that are intensified by cycling rate, overall cycling time and the depth of discharge. The two prime failure modes consist of: (a) unequal cell charge which causes the evolution of gas in sufficient quantities to destroy the cell, and (b) cell reversal on discharge that effectively cancels the cell from the circuit and ultimately results in cell failure. The two objectives of this program were, accordingly, to investigate: (1) methods of equalizing the terminal voltage of the individual cells on charge, and (2) methods of preventing cell reversal upon discharge. (Author)

PB-165 302
Microwave Associates, Inc., Burlington, Mass.
VARACTOR DIODE INDUSTRIAL PREPAREDNESS MEASURES. Quarterly progress rept. no. 5, 25 Jun-24 Sep 61 [1961] 21p
Contract DA36-039-sc-85941
OTS $2.60

DESCRIPTORS: *Varactor diodes, *Diodes, *Variable capacitors, Silicon, Microwave equipment, *Photographic techniques, Manufacturing methods, Industrial production.

This report deals with the photo-resist technique of preparing the silicon mesa. The photo-resist procedure is explained in detail along with a discussion of the vapor deposition of the silicon. The actual change-over from the old method of preparing the silicon mesa is explained in detail. The details discussed in this report will indicate that the photo-resist process will increase the output of the varactor diode. (See also AD-261 600)

PB-165 256
Microwave Research Inst., Polytechnic Inst. of Brooklyn, N. Y.
MILLIMETER WAVEGUIDE COMPONENTS: Quarterly rept. no. 5, 1 Apr-30 Jun 59
John W. E. Griemsmann. Sep 59, 47p
Contract DA36-039-sc-78001
Rept. R-691.5-59; PIB-619.5; AD-228 469
OTS $4.60

DESCRIPTORS: *Microwave equipment, *Waveguides, *Modulators, *Germanium, Probes (Electromagnetic), Frequency meters, Radio interferometers, Microwave networks.

Work on non-injecting contacts for germanium microwave modulator slabs is described as well as modifications in the pulsing equipment to produce sufficiently large electric fields to cause saturation of the electron drift velocity. A traveling probe system for obtaining resistivity profiles of treated germanium slices is described. Further modifications and experiments are discussed. Measurements are reported of the fields inside an H-guide at about 39 kmc. A description is given of the experimental procedures used, and of the results obtained. The various modes that may propagate inside the guide are classified, and calculated values of the cutoff frequencies tabulated. A discussion of the use and design of dielectric lenses for the interferometer wavemeter is presented. A chain of identical dissipative 2N-ports is considered. It is shown that lossless optimizing networks exist which may be inserted between the elements of such a chain to the end that each of the dissipative 2N-ports in the chain is utilized with its optimum efficiency. A synthesis procedure for such lossless optimizing networks is given. A novel mode absorber for the TE_{on} modes of circular waveguide is described. (Author) (See also PB-153 598)

N64-16717
Naval Ammunition Depot, Crane, Ind.
EVALUATION PROGRAM FOR NICKEL CADMIUM SEALED CELLS. ACCEPTANCE TEST OF GENERAL ELECTRIC COMPANY 3.0 AMPERE HOUR CELLS
H. M. Schultz. 23 Aug 63, 22p
Rept. no. QE/C-63-321; NASA CR-55828
OTS $2.60

DESCRIPTORS: *Batteries and components, *Nickel, *Cadmium, *Alkaline cells, Tests,

AD-425 361
Naval Civil Engineering Lab., Port Hueneme, Calif.
IGNITION INTERFERENCE AUTOALARM SYSTEM. Final rept.
J. L. Brooks, 24 Dec 63, 43p
Technical rept. R 269.
OTS $1.25

DESCRIPTORS: *Warning systems, Broadband, Sensitivity, *Ignition systems, Interference, Electromagnetic waves, Detection, *Radiofrequency amplifiers, *Omndirectional antennas.

The system, intended for installation at the entrances of sensitive areas, is designed to detect electromagnetic interference above a predetermined level within a given radius, and to automatically give an optional visible or audible signal. An engineering prototype model was developed. Essentially, the system consists of a control unit, broadband antennas, and associated multicouplers. The control unit consists of a series of high-gain, fixed-frequency, broadband, transistorized amplifiers, all operating in parallel and feeding one trigger circuit. There are 12 channels, each possessing an antenna input, a variable gain control, and a conventional diode detector circuit. The detector outputs are connected in parallel, and each may trigger the alarm unit independently of the others. The alarm indication is a light signal or bell, whichever the operator chooses. The results of an extensive evaluation of the system both in the laboratory and in the field show that it is a very practical device. It can detect a noisy vehicle, and, under controlled conditions, can rapidly measure vehicle interference to the requirements of Mil-I-16910A. (Author)

AD-425 122
Navy Electronics Lab., San Diego, Calif.
MICROCIRCUITRY IN A TYPICAL LOGIC FUNCTION
R. L. Gowan. 19 Aug 63, 101p
NEL rept. 1177
OTS $2.50

DESCRIPTORS: *Microminiaturization (Electronics), *Circuits, *Computer logic, Input-output devices, *Naval procurement, *Quality control, Standards, *Computer systems components,

One decade of a six-decimal-decade, binary-to-decimal converter was chosen as a sample contract assignment for five major contractors claiming capability in the field. Each contractor's product was evaluated as to reliability, conformance with specifications, and cost. Analyses of failure and deficiency, prepared by both the contractors and NEL, with supporting data, are presented. Of the various design approaches submitted for consideration, the single-chip, integrated circuitry appears to be the most feasible for the purpose under study, from the standpoints of size, power requirements, and simplicity of construction. (Author)

N64-16750
New Mexico Univ., Albuquerque Engineering Experiment Station.
MAGNETORESISTANCE AND SUPERCONDUCTIVITY FOR APPLICATION TO DC TO AC CONVERSION. Semi-annual status rept.
Richard Bechtel and W. W. Grannemann. Dec 63, 19p
Grant NsG-279-62
Rept. no. PR-49; NASA CR-53083
OTS $1.60

DESCRIPTORS: *Electric currents, Direct current, Alternating current, *Superconductivity.

AD-421 951
Radiation, Inc., Melbourne, Fla.
TELEMETRY TRANSDUCER HANDBOOD
H. F. Fisher, Jr. Sep 63, 774p
Contracts AF33(616)8309 and AF33(616)7466
WADD-TR-61-67, Vol. I, Revision I, supersedes WADD-TR-61-67, Vol. I dated Jul 61; N64-12704
OTS $11.50

DESCRIPTORS: *Handbooks, *Telemeter systems, *Transducers, Instrumentation, Standards, Calibration, Test methods.

As a result of studies conducted by the Air Force and others it became apparent that there was a need for a comprehensive collection of data on telemetry transducers. The Telemetry Transducer Handbook was prepared in an effort to present information and data useful to the transducer user. The material was prepared in two volumes with general instrumentation information in Volume I and detailed transducer specification data in Volume II. Volume I consists of technical information on telemetry systems, transducer fundamentals, applications, testing and calibration techniques and facilities. (Author)

N64-16107
Research Lab. of Electronics, Mass. Inst. of Tech., Cambridge.
A 22-Gc BALANCED CANONICALLY TUNED VARACTOR QUADRUPLER WITH 50-mw OUTPUT POWER
R. P. Rafuse and D. H. Steinbrecher. [1964] 5p
Grant NsG-419
NASA CR-55223
OTS $1.10

DESCRIPTORS: *Varactor diodes, *Frequency multipliers, *Tuned circuits, Multiple operation, Design.

Presented at the International Solid State Circuits Conference, Philadelphia, Pa., Feb. 19-21, 1964.

SCTM-126-63(72)
Sandia Lab., Albuquerque, N. Mex.
EF-2A AND EF-2B HIGH IMPEDANCE EMITTER FOLLOWERS
John Noe. Jun 63, 6p
Contract AT(29-1)789
OTS $1.10

DESCRIPTORS: *Circuits, *Accelerometers.

N64-15963
Sippican Corp., Marion, Mass.
IMPROVED TECHNIQUES FOR INTERCONNECTING SOLAR CELLS. Study rept.
Jan 64, 24p
Contract NASw-798
Rept. no. R-268; NASA CR-53077
OTS $2.60

DESCRIPTORS: *Solar cells, Lasers, *Welding.

N64-16704
Stanford Research Inst., Menlo Park, Calif.
OPERATING AND MAINTENANCE INSTRUCTIONS FOR STANFORD RESEARCH INSTITUTE GRID MIXER
Albert Macovski, Earle D. Jones, and Hugh F. Frohbach
Nov 63, 64p
Contract NAS5-1882
SRI proj. no. 3927; NASA CR-55900
OTS $6.60

DESCRIPTORS: Instruction manuals, Operation, Maintenance, *Mixers (Electronic), *Electronic equipment.

AD-433 506

Texas Instruments, Inc., Dallas.
THIN FILMS FORMED BY ELECTROCHEMICAL REACTIONS. Final rept., 1 Jun 62-31 Jan 63
W. E. Patterson and C. L. White. Aug 63, 108p
Contract DA36-039-sc-90745
Rept. no. 03-63-27
OTS $9.10

DESCRIPTORS: *Printed circuits, *Tantalum, *Niobium, *Sputtering, *Electrochemistry, Electrolysis, *Metal films, Glass, *Subminiature electronic equipment, Resistors, Capacitors.

A pattern suitable for photolithographic and film deposition work has been designed and utilized in this study of tantalum and niobium film resistors, capacitors, and conductors Techniques have been developed for sputtering these metals and anodizing the resulting films to form microelectronic components Sputtering of tantalum on glass was carried out by holding a particular set of conditions and varying the sputtering time in order to deposit a predetermined thickness of film. It was found in a qualitative way that purity of the sputtering atmosphere affects the film conductivity as well as the anodizing characteristics. The particular substrate used for tantalum film capacitors evidently influences leakage and capacitance when the units are subjected to temperature and humidity cycling. Niobium sputtering was found to be more prone to the gettering of impurities than tantalum, as shown by a poor correlation between film resistivity and thickness, and erratic anodizing characteristics. A group of film components was fabricated with a single composition alloy of 37±3 percent niobium-balance tantalum, and tests were in progress at the end of the reporting period. (Author) (See also AD-299 458)

AD-423 688
Times Wire and Cable Co., Inc., Wallingford, Conn.
DESIGN AND DEVELOPMENT OF IMPROVED WATERTIGHT COAXIAL CABLE. Interim development rept. no. 4, 1 Apr-30 Jun 63
David A. Peterson, 31 Oct 63, 17p
Contract NObsr-87678
Engineering rept. no. 222-D
OTS $0.50

DESCRIPTORS: *Coaxial cables, *Watertight fittings, *Moistureproofing, Polyethylene plastics, Isocyanate plastics, Electrical properties, Design, Construction,

The test results reported show the developed water-blocking technique can be successfully used to produce versions of RG-214/U, RG-217/U and RG-218/U which are watertight at 1000 psi. None of the watertight cables manufactured with the developed technique has ever leaked, even at pressures up to 5000 psi. The components of the cable, i.e., center conductor, dielectric, braid and jacket, have, however, moved in respect to each other on the short test lengths at pressures above 1000 psi. The general construction recommended for watertight coaxial cable is: a bare copper center conductor, a polyethylene dielectric, an outer conductor consisting of a braid of silver plated copper strands with a low braid factor, and the braid treated with the DC-274. The tape over the braid and the jacket should be polyethylene or polyurethane, depending on the desired properties. The program for the completion of the contract is presented. (Author) (See also AD-406 179)

AD-429 136 repriced
Westinghouse Electric Corp., Dayton, Ohio.
DENDRITIC SILICON SOLAR CELL PANEL. Final rept., Aug 62-Aug 63
K. S. Tarneja and V. A. Rossi, ed. Oct 63, 86p
Contract AF33(657)9820
RTD-TDR-63-4030; N64-15091
OTS $2.25

DESCRIPTORS: *Energy conversion, *Semiconductor devices, *Solar cells, *Silicon, Crystal structure, *Solar panels, Construction, Environmental tests.

Studies directed toward the fabrication of high efficiency solar cells on silicon webbed dendrites and the solar cell panels were undertaken. Some of the basic design considerations and fabrication techniques are presented. Preparation of P (+) N and N (+) P solar cell structure is discussed. Cell efficiencies were measured using two tungsten photoflood lamps as the light source. Efficiencies as high as 13% were achieved on 2cm x 1cm x 0.05cm, as high as 12% were achieved on 15cm x 1cm x 0.05cm, and as high as 10% were achieved on 30cm x 1cm x 0.05cm solar cells prepared from silicon webbed dendrites. Spectral response measurements were made on silicon web solar cells and typical curves are presented. One mechanical sample, four operational solar cell panels, and two special operational panels were fabricated, tested and submitted in part fulfillment of the subject contract. Complete results on these panels are discussed. (Author)

AD-427 297 repriced
Westinghouse Electric Corp., Pittsburgh, Pa.
LONG LIFE CLOSED LOOP MHD RESEARCH AND DEVELOPMENT UNIT
R. L. Hundstad, F. A. Holmes, J. G. DeSteese, W. S. Emmerich, and R. E. Voshall. Oct 63, 157p
Contract AF33(657)8311
ASD-TDR-63-4019
OTS $3.00

DESCRIPTORS: *Power supplies, *Magnetohydrodynamics, *Electric power production, Generators, Spaceborne, Helium, Cesium.

Electric power production in space will require lightweight generators using a nuclear reactor as heat source and a hot radiator as heat sink. Because of its capability for operation at high temperatures and absence of moving parts, the MHD generator is an attractive device. A closed-loop MHD generator and motor research unit was designed and built to produce MHD conditions and to gain experience in the operation of MHD generators suitable for space applications. Component parts of the machine were individually tested before assembly. After assembly the first test used helium and cesium as the working fluid. Future plans include tests with different vapors and duct materials together with the incorporation of non-thermal ionization and possibly superconducting magnets. (Author)

Mechanical Engineering

NAS-NRC-1144
Building Research Advisory Board, NAS-NRC, Washington, D. C.
FIELD INVESTIGATION OF UNDERGROUND HEAT DISTRIBUTION SYSTEMS. 1963, 121p
Contract CST-690
Federal Construction Council Technical rept. no. 47
NAS-NRC $4.50

DESCRIPTORS: *Heating plants, *Underground structures, *Pipes, *Steam pipes, Construction, Corrosion, Thermal insulation, Protective coverings, Sealing compounds, Installation, Maintenance, Environmental tests.

On the basis of information gathered from a field study, the performance characteristics of underground heat-distribution systems were evaluated, and the significance of environmental factors affecting system performance was determined.

UCRL-7171
Lawrence Radiation Lab., Univ. of California, Livermore.
APPLIED MECHANICS IN MODERN DESIGN
William N. Findley (Brown Univ.) 28 Dec 62, 36p
Contract W7405-eng-48
OTS $3.60

DESCRIPTORS: *Applied mechanics, *Mechanical engineering,

PB-165 303
[Air Force Missile] Development Center, Holloman AFB, N. Mex.
ANALYTICAL SOLUTIONS FOR THE OPTIMIZATION OF ROCKET TRAJECTORIES
Louis Carl Barrett and Herbert Knothe. Sep 56, 104p
HDR-TM-56-5
OTS $9.10

DESCRIPTORS: *Rocket trajectories, Optimization, Mathematical analysis, Differential equations, Calculus of variations, Thrust, Velocity, *Fuel consumption.

A derivation is established of the general differential equation of rocket motion when drag is neglected and the rocket is ideally regarded as a particle of variable mass. The equation is particularized in the case of a constant, as well as that of an inverse force field. Consideration is given to optimum rocket motion in a constant gravity field, and criteria are established and applied to the determination of the special distribution of all possible positions a rocket may occupy when it terminates in an optimum mode of motion. Three different methods are exhibited for obtaining necessary conditions for optimum rocket motion in a general central force field, one method of which is shown to be applicable also in the case of constant gravity. A law of variation for the angle of thrust during optimum rocket motion in a general, and in an inverse square force field is also derived.

NASA-TN-D-2130
Ames Research Center, National Aeronautics and Space Administration, Moffett Field, Calif.
EFFECTIVENESS OF RADIATION SHIELDS FOR THERMAL CONTROL OF VEHICLES ON THE SUNLIT SIDE OF THE MOON
John C. Arvesen and Frank M. Hamaker. Apr 64, 50p
N64-17723
OTS $1.50

NASA-TN-D-2238
Ames Research Center, National Aeronautics and Space Administration, Moffet Field, Calif.
MIDCOURSE GUIDANCE USING RADAR TRACKING AND ON-BOARD OBSERVATION DATA
Gerald L. Smith and Eleanor V. Harper. Apr 64, 28p
N64-17773
OTS $0.75

NASA-TN-D-2135
Ames Research Center, National Aeronautics and Space Administration, Moffett Field, Calif.
ON THE PITCHING AND YAWING MOTION OF A SPINNING SYMMETRIC MISSILE GOVERNED BY AN ARBITARY NONLINEAR RESTORING MOMENT
Maurice L. Rasmussen (Stanford U.) and Donn B. Kirk. Mar 64, 32p
N64-17734
OTS $0.75

N64-16719
Astrophysical Observatory, Smithsonian Institution, Cambridge, Mass.
CATALOG OF PRECISELY REDUCED OBSERVATIONS NO. P-10.
Phyllis Stern, comp. 1 Oct 63, 206p
Grant NsG-87-60
SAO Special rept. no. 138; NASA CR-55843
OTS $14.00

DESCRIPTORS: *Catalogs, Data, *Orbital trajectories, Satellites (Artificial), Position finding.

N64-16721
Astrophysical Observatory, Smithsonian Institution, Cambridge, Mass.
SATELLITE ORBITAL DATA.
I. G. Izsak. 31 Jan 64, 65p
Grant NsG-87-60
SAO Special rept. 142; NASA CR-55853
OTS $6.60

DESCRIPTORS: *Satellites (Artificial), *Orbital trajectories, Data, Catalogs.

N64-16720

Astrophysical Observatory, Smithsonian Institution, Cambridge, Mass.
SATELLITE ORBITAL DATA NO. E-3.
I. G. Izsak. 30 Jan 64, 31p
Grant NsG-87-60
SAO Special rept. no. 141; NASA CR-55851
OTS $3.60

DESCRIPTORS: *Satellites (Artificial), *Orbital trajectories, Data.

PB-165 304
Ballistic Research Labs., Aberdeen Proving Ground, Md.
RAPID METHODS FOR THE PREDICTION OF DAMAGE BY FRAGMENTS IN ITS DEPENDENCE ON THE VARIABLES OF THE TACTICAL SITUATION
Hans Lewy and R. W. Gurney. Feb 45, 41p
Rept. no. 530
OTS $4.60

DESCRIPTORS: *Projectiles, Air burst, *Ammunition fragments, Ammunition damage, *Explosion effects, Casualties, *Mathematical prediction.

When a projectile bursts in the air, the damage which is done by the fragments to targets on the ground depends on the height of burst, on the orientation of the projectile, on its residual velocity, as well as on its static fragmentation pattern. In this report are given formulas by which a rapid estimate of damage for any type of projectile may be made with good approximation, and the necessary numerical tables are included in an appendix. As illustration of the calculations, a numerical example of casualties as a function of the height of burst has been worked out, and is described in detail. (Author)

AD-425 499
Bell Aerosystems Co., Buffalo, N. Y.
STUDY OF REQUIREMENTS FOR THE SIMULATION OF RENDEZVOUS AND DOCKING OF SPACE VEHICLES. Rept. for Apr 62-Jul 63, on Simulation Techniques for Aerospace Crew Training
John M. Ryken, Jerome E. Emerson, George T. Onega, and James L. Bilz. Oct 63, 191p
Contract AF33(657)8620
AMRL-TDR-63-100; N64-13719
OTS $3.50

DESCRIPTORS: *Spacecraft, *Rendezvous trajectories, Simulation, *Programming (Computers), Digital computers, Analog computers, Flight simulators.

This report presents results of a study to establish computer requirements for the simulation of rendezvous and docking systems in space vehicles. A literature search was made to establish rendezvous and docking systems which have been proposed. A complete simulation of a representative automatically controlled rendezvous and docking system was formulated and programmed on an IBM-7090 digital computer. Sufficient flexibility was incorporated into this simulation so that the proposed rendezvous and docking techniques could be studied. This program was used to determine digital computer requirements for the simulation of rendezvous and docking systems. Mission runs were made covering terminal guidance, docking, departure, retro, and deorbit to the earth's atmosphere. A simplified simulation of rendezvous and docking was programmed on analog computers and coupled with a cockpit simulator. This simulation included an electronic image generation of a target vehicle as viewed by an astronaut through a window in the interceptor vehicle. Information on accuracy of this simulation, pilot control capabilities, and control techniques was obtained. (Author)

NASA-CR-35
Boeing Co., Seattle, Wash.
INITIAL CONCEPT OF LUNAR EXPLORATION SYSTEMS FOR APOLLO. VOLUME I: SUMMARY
Mar 64, 176p
Contract NASw-792
N64-17721
OTS $3.00

PB-165 298
Bureau of Yards and Docks, Washington, D. C.
FLEXIBLE MEASURING DEVICES AND INSPECTION OF OPERATION JANGLE STRUCTURES. Final rept. for Feb-May 55, on Operation Teapot, Nevada Test Site
C. O. Dohrenwend, L. D. Mills, J. S. Kinney, and E. E. Shalowitz. 28 Jul 58, declassified 19 Feb 62, 121p
Rept. no. WT-1125
OTS $10.10

DESCRIPTORS: *Structures, *Underground explosions, Damage, *Explosion effects.

The project was planned and executed to determine the influence of certain parameters, especially structural flexibility, on the loads generated normal to a structure by earth-propagated pulses from underground explosions and to inspect the damage to certain existing Operation Jangle structures and utilities within 1,000 feet of ground zero. (Author)

NASA-SP-32, v. 1
Goddard Space Flight Center, National Aeronautics and Space Administration, Greenbelt, Md.
TELSTAR I, VOLUME I
Jun 63, 400p
N64-10868; includes N64-10869-10881
OTS $10.00 per set

DESCRIPTORS: *Communication satellites, *Satellites (Artificial), Design, Performance (Engineering),

NASA-SP-32, v. 2
Goddard Space Flight Center, National Aeronautics and Space Administration, Greenbelt, Md.
TELSTAR I, VOLUME 2
Jun 63, 525p
N64-10882; includes N64-10883-10897
OTS $10.00 per set

DESCRIPTORS: *Communication satellites, *Satellites (Artificial), Ground support equipment, Design, Performance (Engineering),

NASA-SP-32, v.3
Goddard Space Flight Center, National Aeronautics and Space Administration, Greenbelt, Md.
TELSTAR I, VOLUME 3
Jun 63, 283p
N64-11079; includes N64-11080-11089
OTS $10.00 per set

DESCRIPTORS: *Communication satellites, *Satellites (Artificial), Instrumentation, Design, Performance (Engineering),

NASA-TN-D-2144
Goddard Space Flight Center, National Aeronautics and Space Administration, Greenbelt, Md.
TRIAXIAL BALANCING TECHNIQUES (A STUDY OF SPACECRAFT BALANCE WITH RESPECT TO MULTIPLE AXES)
William E. Lang. Mar 64, 37p
N64-17155
OTS $1.00

DESCRIPTORS: *Spacecraft, *Stabilization, *Mechanics, Equations, Vector analysis.

NASA-TM-X-949
Langley Research Center, National Aeronatuics and Space Administration, Langley Station, Va.
THE EXPLORER XVI MICROMETEOROID SATELLITE. SUPPLEMENT III, PRELIMINARY RESULTS FOR THE PERIOD MAY 27, 1963, THROUGH JULY 22, 1963
Earl C. Hastings, Jr. Mar 64, 38p
N64-16692
OTS $1.00

DESCRIPTORS: *Satellites (Artificial), Penetration, *Space environmental conditions, Experimental data,

UCRL-7224(Rev. II)
Lawrence Radiation Lab., Univ. of California, Livermore.
THE PHENOMENOLOGY OF THE MASS MOTION OF A HIGH ALTITUDE NUCLEAR EXPLOSION
Stirling A. Colgate. 13 May 63, 34p
Contract W7405-eng-48
OTS $3.60

DESCRIPTORS: High altitude, *Nuclear explosions

NASA-TN-D-1989
Lewis Research Center, National Aeronautics and Space Administration, Cleveland, Ohio
THE DESIGN OF MICROMETEOROID PENETRATION EXPERIMENTS AS SINGLE-SAMPLING LIFE-TEST SAMPLING PLANS
Arthur G. Holms. Mar 64, 33p
N64-17153
OTS $0.75

DESCRIPTORS: Spacecraft, *Fuel tanks, *Storage tanks, Reliability, Penetration, *Meteors, *Test methods, *Sampling.

LADC-5776
Los Alamos Scientific Lab., N. Mex.
THE EFFECT OF SPECIFIC SURFACE ON THE EXPLOSION TIMES OF SHOCK INITIATED PETN
Robert H. Dinegar, Richard H. Rochester, and Mike S. Millican. [1963] 8p
Contract W7405-eng-36
CONF-117-1
OTS $1.10

DESCRIPTORS: Explosive materials, *PETN, *Ignition

American Chemical Society National Meeting, New York, Sep 63

N64-16748
McDonnell Aircraft Corp., St. Louis, Mo.
OPTIMUM DIGITAL ADAPTIVE ATTITUDE CONTROL SYSTEM FOR SPACE VEHICLES. Final rept.
James C. Bowers. 6 Jan 64, 92p
Contract NASw-614(SC-4734)
Rept. A405; NASA CR-53109
OTS $8.60

DESCRIPTORS: *Spacecraft, Digital systems, *Adaptive control systems, Attitude control systems, Feasibility studies.

AD-294 927
Minneapolis-Honeywell Regulator Co., St. Petersburg, Fla.
STAR TRACKER AEROSPACE REFERENCE STUDY - STARS. Final rept., Oct 61-Nov 62
F. McCanless, G. Quasius, and W. Unruh. 20 Jan 63, 430p
Contract AF33(657)7249
Aero rept. 61933-2; ASD-TDR-62-1056
OTS $22.25

DESCRIPTORS: *Star trackers, *Celestial navigation, *Space navigation, Celestial guidance, Stars, Celestial mechanics, Navigation, Aerospace craft, Design, Performance (Engineering)

The Star Tracker Aerospace Reference Study (Project STARS) covers system and signal processing analyses of star trackers in aerospace navigation and guidance applications. The objectives of the study are: to provide a sound engineering basis for the selection of star tracking system parameters and design criteria in typical mission applications; to formulate bases for evaluating best over-all system performance achievable using the given star tracker design criteria; to establish configurations which maximize the probability of detecting the given star while minimizing the uncertainty in determining the location of the star; and to specify the required processing and component design performance for the various typical mission applications. (Author)

AD-424 518
Naval Ordnance Lab., White Oak, Md.
INITIATION OF EXPLOSIVES BY EXPLODING WIRES
Howard S. Leopold. 15 May 63, 44p
NOLTR 63-159
OTS $1.25

DESCRIPTORS: *Explosives initiators, *Exploding wires, Platinum, PETN, Capacitors, Circuits, Inductance, Analysis,

The effects of circuit inductance and bridgewire length on the initiation of PETN by exploding platinum wires were investigated. A capacitor discharge was used as the energy source. Oscillograms of current and voltage coincident with smear camera records were used to interpret the wire explosion and initiation processes. Increasing circuit inductance lowers the probability of producing detonation in PETN by an exploding wire. Secondary current pulses have little effect on whether or not detonation results. For effective initiation the bridgewire length should be chosen to eliminate current dwell. (Author)

AD-423 675
Naval Ordnance Lab., White Oak, Md.
AN INVESTIGATION OF DELAY TIME VARIATION IN PRODUCTION LOADED MK 14 MOD O DELAY ACTUATORS
Vincent J. Menichelli. Jan 64, 21p
NOLTR-63-213
OTS $0.75

DESCRIPTORS: *Delay elements (Explosive), *Explosive actuators, Military requirements, Specifications, Performance (Engineering), Analysis,

The Mk 14 Mod O Delay Actuator was developed at NOL(WO). The delay time requirements for procurement purposes were based on development and preproduction delay time data. Initial production actuators had erratic delay times which did not meet the specification requirements. The cause for the erratic delay times was determined to be gas leakage through the phenolic initiator plug. When the leakage was corrected the actuators met the specification requriements with ease. (Author)

AD-426 466
Naval Ordnance Lab., White Oak, Md.
THE PREDICTION OF VERY-LOW EED FIRING PROBABILITIES
J. N. Ayres, L. D. Hampton, and I. Kabik. Jan 64, 32p
NOLTR-63-133; N64-13646
OTS $1.00

DESCRIPTORS: *Explosives initiators, *Fuzes (Ordnance), Firing circuits, Safety, Reliability, Mathematical prediction, *Statistical processes.

EED (Electro-explosive devices) functioning probability levels needed for estimating weapon safety and reliability cannot be measured exactly. Existing interpretations of "All-Fire" and "No-Fire" levels often are seriously in error or even invalid. Practical procedure for reducing errors in estimating extreme functioning probability levels are presented: proper sampling, proper instrumentation, optimization of data collection procedures, and selection of proper statistical tools. (Author)

TID-16580
Sandia Corp., Albuquerque, N. Mex.
SHOCK INITIATION OF GRANULAR EXPLOSIVES PRESSED TO LOW DENSITIES
Glenn E. Seay. [13 Aug 62] 11p
Contract AT(29-1)789
SCDC-2646
OTS $1.60

PB-165 299
Stanford Research Inst. [Menlo Park] Calif.
SCALED HIGH EXPLOSIVE TESTS. Rept. for Oct-Nov 51, on Operation Jangle, Nevada Proving Grounds
E. B. Doll and V. Salmon. Apr 52, declassified 1 Dec 1 Dec 58, 298p
Rept. no. WT-365
OTS $18.50

DESCRIPTORS: *Underground explosions, Nuclear explosions, Simulation, *Explosion effects.

The series of four HE tests at the Nevada Test Site was conducted to provide information for scaled predictions for the shallow underground and surface nuclear tests. The results of the HE tests were quite satisfactory, and predictions were made only if justified by the demonstrated adherence to scaling laws within the HE test series. In addition, correlation with results from 1951 Dugway tests in dry clay was obtained. A comparison with Dugway results (for dry clay) from similar tests indicates that the earth-acceleration amplitudes and durations were approximately inverse to each other for the two soils, with the Dugway amplitudes considerably less than for the HE program. This cannot be explained by a simple soil constant, and probably indicates that much depends on details of the transfer of energy from the expanding gas bubble to the soil. The assumption of considerable cohesion in Dugway soil gave a qualitative explanation to many of the observations. (Author)

LADC-5410
Los Alamos Scientific Lab., N. Mex.
RESPIRATORS FOR PROTECTION AGAINST AIRBORNE RADIOACTIVE CONTAMINANTS
E. C. Hyatt. [21 Aug 62] 45p
Contract W7405-eng-36
OTS $4.60

DESCRIPTORS: *Respirators, *Gas masks,

TID-19126
North Carolina State Coll., Raleigh.
INSTITUTE IN FUNDAMENTALS OF RADIATION AND RADIOLOGICAL PROTECTION. Final rept. for 9 Jun 62-30 May 63. Prepared in cooperation with North Carolina Univ., [1963] 93p
Contract AT(40-1)2977
OTS $8.60

DESCRIPTORS: *Civil defense systems

CONF-84-2
Reynolds Electrical and Engineering Co., Inc., Mercury, Nev.
INDUSTRIAL HYGIENE ASPECTS OF UNDERGROUND NUCLEAR WEAPON TEST DEBRIS RECOVERY
Floyd W. Wilcox. 27 Mar 63, 8p
Contract AT(29-2)162
OTS $1.10

DESCRIPTORS: *Underground explosions, *Nuclear explosions, *Cratering

American Industrial Hygiene Conference, Cincinnati, May 1963

AD-424 860
Southwest Research Inst., San Antonio, Tex.
AN INVESTIGATION OF THE HAZARDS OF COMBUSTION PRODUCTS IN BUILDING FIRES. Final rept. F. W. Bieberdorf and C. H. Yuill. 14 Oct 63, 83p
Contract PH86-62-208
SwRI Proj. no. 3-1237-3
OTS $2.25

DESCRIPTORS: *Fire safety, Buildings, Fires, Hazards, *Combustion products, Materials, Construction, Hospitals, Design, *Safety,

A study is made of the literature and previous experimental effort to define the hazard of combustion products in accidental building fires and the manner in which the selection and use of building materials may be related thereto. Smoke and toxic gases appear to be the primary hazards in most fires although heat, oxygen deficiency, panic, and emotional shock may become primary hazards under special conditions. The importance of incorporating sound fire protection engineering principles into building design and building alteration is emphasized. Fires involving heavy loss of life almost invariably are characterized by flagrant and multiple violation of such principles. Emphasis is placed on the practicability of minimizing the hazard of combustion products through the application of known principles of fire protection engineering. Evidence to support the need for further experimental effort to define hazards and to develop controls as needed is presented, and recommendations are offered outlining the proposed nature of such work. (Author)

FOOD, HANDLING, AND PACKAGING EQUIPMENT

PB-163 600
West Virginia Pulp and Paper Co., Tyrone, Pa.
STUDIES TO DETERMINE OPTIMUM CHARACTERISTICS OF IN-PACKAGE ACTIVATED CHARCOALS FOR REMOVAL OF "IRRADIATION FLAVOR" DURING STORAGE. Rept. no. 6 (Final), 10 Jun 58-9 Mar 60
Henry F. Laughlin, Ruth S. Caldwell, Charles T. Crist, Boyd C. Jensen, and James E. Lebo. 9 Mar 60, 24p
Contract DA19-129-qm-1212
QMFCIAF File no. S-580; AD-243 399
OTS $2.60

DESCRIPTORS: *Irradiated foods, Acceptability, Beef, Storage, Odors, *Taste, Carbon, *Absorption (Physical), *Charcoal

The presence of active carbon in cans of irradiated beef appears to be desirable as it markedly reduced the amount of odor observed when the cans were opened (as compared to cans of irradiated beef with no carbon present). Although all active carbons under consideration adsorbed some of the irradiation odor as indicated above, odor and flavor evaluations after the beef was removed from the cans showed no significant differences in efficiency among the various active carbons. The active carbons had varying physical and chemical characteristics but none of these correlated with irradiation odor removal. (Author)

MACHINERY, FABRICATION, AND ACCESSORY EQUIPMENT

NASA-TN-D-2261
Goddard Space Flight Center, National Aeronautics and Space Administration, Greenbelt, Md.
ROLLING ELEMENT SLIP RINGS FOR VACUUM APPLICATION
Edward J. Devine. Apr 64, 17p
N64-17752
OTS $0.50

UCRL-7072
Lawrence Radiation Lab., Univ. of California, Livermore
A SUMMARY OF FOUR PAPERS PRESENTED AT THE 1962 IMOG (INTERAGENCY MECHANICAL OPERATIONS GROUP) GENERAL MEETING
J. E. Bowerbank, J. B. Ryan, K. O. Malmquist, Jr., and R. Spies. [1962] 26p
Contract W7405-eng-48
OTS $2.60

DESCRIPTORS: *Machine tools, *Meters, *Machining

Engines and Propulsion Systems

N64-16710
Aeronautical Sciences Lab., Univ. of California, Berkeley.
RADIATIVE ENERGY TRANSFER TO OUTER BASE REGIONS OF CYLINDRICAL AND CONICAL GAS BODIES
C. L. Tien and M. M. Abu-Romia. 20 Oct 63, 77p
Contract NAS8-850
Rept. no. AS-63-4; NASA CR-55832
OTS $7.60

DESCRIPTORS: *Rocket motors, *Exhaust gases, *Emissivity, Cylindrical bodies, Conical bodies,

N64-16754
Minneapolis-Honeywell Regulator Co., Minn.
ROCKET BOOSTER CONTROL. SECTION 13: AN APPLICATION OF THE QUADRATIC PENALTY FUNCTION CRITERION TO THE DETERMINATION OF A LINEAR CONTROL FOR A FLEXIBLE VEHICLE
E. E. Fisher. 21 Jan 64, 30p
Contract NASw-563
MH MPG rept. 1541-TR-13; NASA CR-53121
OTS $2.60

DESCRIPTORS: Linear systems, *Thurst vector control systems, *Movable rocket motors, Operation, Equations, Numerical analysis, Feedback, Control theory, *Booster rockets,

N64-16761
Minneapolis-Honeywell Regulator Co., Minn.
ROCKET BOOSTER CONTROL. SECTION 14: MINIMUM DISTURBANCE EFFECTS CONTROL OF LINEAR SYSTEMS WITH LINEAR CONTROLLERS
C. A. Harvey. 30 Dec 63, 33p
Contract NASw-563
MH MPG Rept. no. 1541-TR-14; NASA CR-53110
OTS $3.60

DESCRIPTORS: *Booster rockets, *Control systems, Linear systems, Control theory,

N64-16759
Minneapolis-Honeywell Regulator Co., Minn.
ROCKET BOOSTER CONTROL. SECTION 16: A MINIMAX CONTROL FOR A PLANT SUBJECTED TO A KNOWN LOAD DISTURBANCE
H. E. Gollwitzer. 1 Jan 64, 17p
Contract NASw-563
MH MPG rept. 1541-TR-16; NASA CR-53115
OTS $1.60

DESCRIPTORS: *Booster rockets, *Control systems, *Linear programming, Calculus of variations,

N64-16742
Minneapolis-Honeywell Regulator Co., Minn.
STATE DETERMINATION FOR A FLEXIBLE VEHICLE WITHOUT A MODE SHAPE REQUIREMENT. ROCKET BOOSTER CONTROL, SECTION 12
E. E. Fisher, 28 Jan 64, 9p
Contract NASw-563
MH MPG rept. 1541-TR-12; NASA CR-53099
OTS $1.10

DESCRIPTORS: *Booster rockets, *Control systems, Linear programming, Least squares method, Non-linear systems, Thrust vector control systems,

AD-425 147
Plastics Technical Evaluation Center, Picatinny Arsenal, Dover, N. J.
FILAMENT WINDING IN MILITARY APPLICATIONS. A DISCUSSION OF PROBLEMS ASSOCIATED WITH FILAMENT WOUND MOTOR CASES
Allen M. Shibley. Sep 63, 38p
Plastec note 8; N64-14314
OTS $1.00

Presented at Symposium on Design Criteria for Plastics, sponsored by Picatinny Arsenal, U. S. Army Munitions Command, at Stevens Institute of Technology, Hoboken, New Jersey, 11-13 September 1963

DESCRIPTORS: *Manufacturing methods, *Filament wound construction, *Rocket motors, Glass textiles, Military requirements, Performance (Engineering), Analysis.

Design of filament wound structures is discussed in relation to material selection, winding technique, quality control, process control and test methods. The design is illustrated by specific example of a rocket motor chamber. Buckling, which has become more critical with higher strength lighter weight chambers, is analyzed together with other important engineering properties of the glass filament reinforced composite. (Author)

Manufacturing Equipment and Processes

TID-19156
Hanford Atomic Products Operation, Richland, Wash.
SPECIFICATION. FABRICATION OF STAINLESS STEEL FOR MILDLY CORROSIVE RADIOACTIVE SERVICE
W. H. Koontz. 31 Jan 63, 6p
Contract AT(45-1)1350
HWS-5938(Rev. 3)
OTS $1.10

DESCRIPTORS: *Stainless steel, *Welding.

TID-19155
Hanford Atomic Products Operation, Richland, Wash.
SPECIFICATION. FABRICATION OF STAINLESS STEEL SHELL AND TUBE HEAT EXCHANGERS FOR AGGRESSIVELY CORROSIVE RADIOACTIVE SERVICE
W. H. Koontz. 31 Jan 63, 3p
Contract AT(45-1)1350
HWS-5937(Rev. 1)
OTS $1.10

DESCRIPTORS: *Stainless steel, *Welding, *Heat exchangers.

TID-19157
Hanford Atomic Products Operation, Richland, Wash.
SPECIFICATION. WELDING OF STAINLESS STEEL FOR CRITICAL WELDS FOR AGRESSIVELY CORROSIVE RADIOACTIVE SERVICE
P. S. Kingsley. 5 Apr 63, 10p
Contract AT(45-1)1350
HWS-8240(Rev. 3)
OTS $1.10

DESCRIPTORS: *Stainless steel, *Welding.

TID-19160
Hanford Atomic Products Operation, Richland, Wash.
SPECIFICATION WELDING OF STAINLESS STEEL FOR PROCESS QUALITY WELDS FOR MILDLY CORROSIVE RADIOACTIVE SERVICE
P. S. Kingsley. 10 Apr 63, 9p
Contract AT(45-1)1350
HWS-8241(Rev. 4)
OTS $1.10

DESCRIPTORS: *Stainless steel, *Welding.

ORNL-TM-602
Oak Ridge National Lab., Tenn.
FABRICATION OF RADIATORS FOR BOILING HEAT-TRANSFER EXPERIMENTS
E. A. Franco-Ferreira. 23 Aug 63, 21p
Contract W7405-eng-26
OTS $2.60

DESCRIPTORS: *Radiators, Heat transfer, *Heat exchangers

TID-15751
Sandia Corp., Albuquerque, N. Mex.
EVALUATING SUPPLIER QUALITY SYSTEMS
David L. Field. [5 Jun 62] 10p
Contract AT(29-1)789
SCDC-2667
OTS $1.10

DESCRIPTORS: *Quality control, *Sampling

MATERIALS

AD-421 973
Coating and Chemical Lab., Aberdeen Proving Ground, Md.
DEVELOPMENT AND EVALUATION OF A LABORATORY BENCH SCALE HEAT TRANSFER APPARATUS
Robert R. Buntin. 30 Aug 63, 26p
CCL rept. no. 146; N63-23719
OTS $0.75

DESCRIPTORS: *Coolants, *Heat transfer, Effectiveness, *Test equipment, Design, Heat transfer coefficients, Determination, Corrosion,

The report describes work done on the development and evaluation of a laboratory bench scale heat transfer apparatus for determining the heat transfer efficiency of automotive coolants. A bench unit was constructed and used for measuring forced convection heat transfer coefficients of several typical coolants. Measurements were made under boiling and non-boiling conditions. The

method employed uses a small electrically heated wire as a heat dissipating surface and at the same time as a resistance thermometer for determining surface temperature. The usefulness of the unit has been demonstrated by preliminary data showing significant differences in heat transfer ability of presently used coolants, especially at higher metal temperatures. The unit is also capable of providing data on the effect of corrosion or other surface reaction on heat transfer. (Author)

AD-422 242
Defense Metals Information Center, Columbus, Ohio.
PREPARATION AND PROPERTIES OF FIBER-REINFORCED STRUCTURAL MATERIALS
D. E. Price and H. J. Wagner. 22 Aug 63, 25p
Contract AF33(616)7747
DMIC memo. 176
OTS $0.75

DESCRIPTORS: *Composite materials, *Cermets, *Reinforcing materials, Fibers, *Ceramic materials, *Metallic textiles, Wire, *Whiskers (Single crystals), Preparation, Mechanical properties, Structures,

The purpose of the memorandum is to summarize the results of work that has been done on development of fiber-reinforced structural materials, wherein either the fibrous phase or the matrix phase is metallic. Materials used, methods of their preparation, and the resultant mechanical properties are the principal areas covered. (Author)

CONF-112-3
Oak Ridge National Lab., Tenn.
APPLICATIONS OF A PHASE-SENSITIVE EDDY-CURRENT INSTRUMENT
C. V. Dodd. [1962] 16p
Contract W7405-eng-26
OTS $1.60

DESCRIPTORS: *Materials, *Test equipment, *Nondestructive testing

National Convention on Nondestructive Testing, Los Angeles, Mar 63

AD-422 028
Rock Island Arsenal Lab., Ill.
PERFORMANCE OF URETHANE VULCANIZATES IN ENVIRONMENTS OF HIGH HUMIDITY. Technical rept.
Frank B. Testroet. 30 Aug 63, 37p
Rept. no. 63-2808
OTS $1.25

DESCRIPTORS: *Elastomers, *Vulcanizates, *Isocyanate plastics, Environmental tests, Degradation, *Tropical deterioration, Preservation, Additives, Polymers, Organic nitrogen compounds, Phenols, Chlorides,

Polyester urethane elastomeric end items have exhibited severe breakdown after service periods of as little as one to two years. The rubber becomes tar-like within an unreasonably brief period of service and is rendered unfit for further use. Duplication of this rubber failure under laboratory conditions was accomplished by exposing specimens over water at 158°F and at room temperature. Two modes of degradation appear to occur simultaneously and independently of one another; i.e., hydrolysis or chain scission of specimens exposed at 158°F and microorganism attack of the specimen at room temperature accompanied by hydrolysis. A polycarbodiimide and pentachlorophenol demonstrate their ability to retard chain scission and microorganism attack, respectively. Unfortunately, pentachlorophenol interferes somewhat with the efficiency of the polycarbodiimide when the two materials are used in admixture. Polyether urethane vulcanizates, containing no special additives, are not adversely affected by environments of high humidity. (Author)

AD-426 365
Watervliet Arsenal, N. Y.
WHISKERS AND WHISKER-STRENGTHENED COMPOSITE MATERIALS. Technical rept.
M. J. Salkind. Oct 63, 34p
Rept. no. WVT-RR-6315
OTS $1.00

DESCRIPTORS: *Composite materials, *Whiskers (Single crystals), Tensile properties, Preparation, *Crystal growth, Reviews.

The report represents the results of a literature survey in the field of whiskers and whisker-strengthened composites. Subjects included are: experimental techniques for producing whiskers, whisker growth mechanisms, mechanical behavior of whiskers, composite materials, and research techniques unique to whiskers. (Author)

Ceramics and Refractories

AD-421 084
Aeronutronic, Newport Beach, Calif.
INVESTIGATION OF MECHANISMS FOR OXIDATION PROTECTION AND FAILURE OF INTERMETALLIC COATINGS FOR REFRACTORY METALS. PART I. MOLYBDENUM DISILICIDE
R. W. Bartlett. Jun 63, 78p
Contract AF33(657)9170
ASD-TDR-63-753, Part I
OTS $2.00

DESCRIPTORS: *Refractory coatings, Intermetallic compounds, *Silicides, Films, Oxidation, Refractory metals, Protective coverings, Microstructure, Impurities, Failure (Mechanics)

A thermogravimetric and electron microscopic study of the oxidation of molybdenum silicides, particularly $MoSi_2$, was made using powders and hot pressed samples. Temperatures below 1450°C and oxygen pressures from 0.01 to 1 atm were employed. Oxidation of $MoSi_2$ is retarded by a continuous adherent oxide layer which consists of 1-20μ islands containing MoO_3 and cristobalite included within an amorphous matrix film. The kinetic data lacked good reproducibility but could be fitted by assuming that growth of the matrix film obeyed the parabolic oxidation rate for silicon while the island growth followed Evan's self blocking pore theory of oxidation. Below 600°C the islands are absent but nonadherent amorphous specks of SiO_2 and MoO_3 crystals form on the amorphous film. The SiO_2 specks appear as clusters of ~ 200 Å spherical particles growing on randomly oriented nucleation sites.

This growth is not self limiting and constitutes Fitzers' silicide "pest". This study is being continued and extended to a study of the oxidation behavior of silicide coatings on molybdenum. (Author)

AD-427 104 repriced
Carbon Research Lab., Univ. of Buffalo, N. Y.
INVESTIGATION OF ELASTIC AND THERMAL PROPERTIES OF CARBON-BASE BODIES. Rept. for Feb 62-Aug 63, on Refractory Inorganic Nonmetallic Materials
S. Mrozowski, J. F. Andrew, N. Juul, S. Sato, and H. E. Strauss. Oct 63, 77p
Contract AF33(616)7791
WADC-TR-58-360, Part V: N64-15068
OTS $2.00

DESCRIPTORS: *Refractory materials, *Carbon, *Graphite, *Pyrolytic graphite, Graphited materials, Heat treatment, Elasticity, Physical properties, Internal friction, Strain (Mechanics), Neutron beams.

In continuation of the work on elastic properties of carbons, using the greatly improved high temperature equipment, families of curves of the dependence of Young's modulus on temperature and on the heat treatment have been obtained for four basic types of carbons and as far as possible, for a number of special types of commercial carbons. The amplitude dependence of internal friction and dynamic Young's modulus were investigated in the sonic range for a number of types of carbons as made and also neutron irradiated, as well as the temperature dependence of internal friction of the resonance frequency from room down to liquid hydrogen temperature. The presence of a Bordoni peak at 50 K has been found connected with the relaxation of motion of dislocations. Families of curves of the dependence of heat conductivity and electric resistivity on temperature and on the heat treatment have been obtained for four basic types of carbons, using an improved technique. The "steady" sinusoidal wave technique for determination of heat diffusivity has been improved in precision and extended in temperature range and data collected for several types of graphitized materials. (Author) (See also AD-282 006)

UCRL-7430
Lawrence Radiation Lab., Univ. of California, Livermore.
THERMAL STRESS FRACTURE CHARACTERISTICS OF BeO
William M. Wells and Carl F. Cline. 15 Jul 63, 27p
Contract W7405-eng-48
CONF-102-3
OTS $2.60

DESCRIPTORS: *Beryllium, *Oxides, Mechanical properties.

American Society Mechanical Engineers Meeting, Philadelphia, Nov 63

AD-428 006 repriced
ManLabs, Inc., Cambridge, Mass.
INVESTIGATION OF BORIDE COMPOUNDS FOR VERY HIGH TEMPERATURE APPLICATIONS. Rept. for Apr 62-Sep 63, on Refractory, Inorganic Non-Metallic Materials
Larry Kaufman and Edward V. Clougherty. Dec 63, 389p
Contract AF33(657)8635
RTD-TDR-63-4096, Part I; N64-15100
OTS $5.00

DESCRIPTORS: *Refractory materials, *Borides, Hafnium compounds, Niobium compounds, Tantalum compounds, Titanium compounds, Zirconium compounds, Powders, Material forming, Single crystals, Crystal growth, Sintering, Crystal lattices, Physical properties, Mechanical properties, Thermodynamics.

A comprehensive study of the properties of high purity well characterized samples of TiB_2, Zrb_2, HfB_2, NbB_2, and TaB_2 was performed. Floating zone refining and high pressure hot pressing were used to prepare single crystal and polycrystalline material respectively. An investigation of the sintering mechanism of TiB_2 was performed. Powder purification procedures by acid leaching and vacuum heating were examined. Properties measured included lattice parameter, X-ray thermal expansion, linear thermal expansion, electrical resistivity and microhardness. These quantities were obtained for materials which satisfied the sample requirements for the various experiments. Measurements were generally performed between room temperature and 1000 C. Thermal conductivity measurements between 1000 and 2000 C are in progress. (Author)

AD-424 853
Materials Advisory Board, NAS-NRC, Washington, D. C.
MATERIALS ADVISORY BOARD REPORT ON CERAMIC PROCESSING. 18 Nov 63, 100p
Rept. no. MAB-197-M
OTS $2.25

DESCRIPTORS: *Research program administration, *Quality control, Manufacturing methods, *Ceramic materials, Military requirements, *Armed forces procurement.

Full utilization of the potential of ceramic materials in defense systems has been retarded both by the lack of basic information and by the lack of reproducibility, reliability, and uniformity which has accompanied transfer from the laboratory to production. These difficulties are attributed to the lag of the science of processing behind the science of ceramic materials. To close this gap it is recommended that selected topics in research, empirical development, and studies of scale-up in numbers and size be supported independently of end-item contracts. (Author)

AD-426 185
National Carbon Co., Inc., Parma, Ohio.
RESEARCH AND DEVELOPMENT ON ADVANCED GRAPHITE MATERIALS. VOLUME XX. THE ELECTRIC AND MAGNETIC PROPERTIES OF PYROLYTIC GRAPHITE. Rept. on Refractory Inorganic Non-Metallic Materials; Materials Application; and Process Development for Graphite Materials
G. Wagoner and B. H. Eckstein. Nov 63, 27p
Contract AF33(616)6915
WADD-TR-61-72, Volume XX; N64-15577
OTS $0.75

DESCRIPTORS: *Refractory materials, *Graphite, *Pyrolytic graphite, Metallography, X-ray diffraction analysis, Crystal structure, Magnetic properties, Electrical properties, Hall effect, Quantum mechanics.

The paper concerns the electric and magnetic properties of a series of highly turbostratic pyrolytic graphite deposits. The diamagnetic susceptibility, Hall coefficient, and electron spin resonance g value are observed to have much larger magnitudes than corresponding measurements made on single crystals of graphite. The results are interpreted as being due to the turbostratic character of the deposit which brings about a decreased interaction between the randomly rotated graphitic planes. The overlap of the electron and hole bands is thereby reduced and as a first approximation one can interpret the results using the simple two dimensional model of Wallace. McClure's diamagnetism formula, which is based on the Wallace model, yields a maximum trace value of -39 emu/g. The largest observed value is -33.5 emu/g, a diamagnetism almost 50 per cent greater than the normal single crystal value of -22.8 emu/g. To obtain from theory the large variation of g shift and diamagnetism as a function of formation temperature, it is necessary that acceptors be present whose concentration decreases as the temperature of formation increases. Similar acceptors have been postulated by others to explain in properties of high temperature carbons. (Author) (See also AD-427 734)

Fuels, Lubricants, and Hydraulic Fluids

PB-165 280
Bituminous Coal Research, Inc., Monroeville, Pa.
A STUDY OF ULTRAFINE COAL PULVERIZATION AND ITS APPLICATION. Final rept., Oct 61-Oct 63
R. S. Glenn and R. J. Grace. [1963] 179p.
Contract 14-01-0001-226
BCR-L-117;
Office of Coal Research, Research and Development rept. no. 5
OTS $12.50

DESCRIPTORS: *Coal, *Powders, Preparation, Particle size, *Grinders, *Ball mills, Transportation, *Pneumatic systems, *Conveyors.

A detailed report is given concerning research and development activities related to the development of the necessary processes and methods to prepare, transport, and use pulverized coal in ultrafine sizes (5 to 74 microns).

NASA-TN-D-2167
Lewis Research Center, National Aeronautics and Space Administration, Cleveland, Ohio
SPONTANEOUS REIGNITION OF PREVIOUSLY EXTINGUISHED SOLID PROPELLANTS
Carl C. Ciepluch. Mar 64, 16p
N64-17156
OTS $0.50

DESCRIPTORS: *Autoignition, Ignition, *Propellants, *Solid rocket propellants, Combustion, Tests.

NASA-TN-D-2256
Ohio State Univ., Columbus.
FORMATION OF DETONATION WAVES IN HYDROGEN-OXYGEN MIXTURES FROM 0.2 TO 2 ATMOSPHERES INITIAL PRESSURE IN A 54-METER LONG TUBE
Loren E. Bollinger. Apr 64, 41p
Grant NsG-44-60
N64-17751
OTS $1.00

PB-165 287
Rock Island Arsenal Lab., Ill.
DEVELOPMENT OF AN IMPROVED RESIN-BONDED DRY FILM LUBRICANT
G. P. Murphy and F. S. Meade. 15 Jul 60, 15p
Rept. no. 60-2192; AD-246 925
OTS $1.60

DESCRIPTORS: *Lubricants, *Epoxy plastics, *Phenolic plastics, *Graphited materials, Molybdenum compounds, Sulfides, Lubricant additives, Antimony compounds, Oxides, Plastic films, Wear resistance.

Various chemical compounds were incorporated in varying amounts in a resin-bonded dry film lubricant formulation containing naturally occurring molybdenum disulfide and synthetic graphite dispersed in an epoxy-phenolic resin system. The wear life of these experimental formulations, in terms of minutes, was determined by the Falex Wear Test. A formulation was developed which produced a Falex Test wear life considerably greater than commercially available resin-bonded dry film lubricants. This formulation consists of an epoxy-phenolic resin system pigmented with naturally occurring molybdenum disulfide, naturally occurring graphite, and reagent grade antimony trioxide. This resin-bonded dry lubricant has been designated as RIA Compound 9A. This product in its present state of development does not provide corrosion protection. The procedure for applying the film recommended applications and limitations, and factors effecting wear life, are discussed. (Author)

AD-297 773
South Carolina Univ., Columbia.
AN INVESTIGATION OF OIL FILM THICKNESS BETWEEN INVOLUTE GEAR TEETH. Final rept., 11 Oct 60-11 Oct 62
I. O. MacConochie and L. C. Hsu. [1962] 39p
Grant DA-ORD-31-124-61-G30
AROD no. 2458:4; N63-13487
OTS $3.60

DESCRIPTORS: *Lubricants, *Oils, *Gears, Films, Thickness, Loading (Mechanics), Elasticity, Viscosity, Surface properties, Deformation

Early efforts were a continuation of attempts to formulate an analytical description of relaxation effects in lubricants. Subsequently, an attempt was made to correlate experimental data of per cent boundary operation with a dimensionless grouping of the load, speed and viscosity. Later efforts were directed to a study of four basic factors and the possible effects they may have on the lubrication and load carrying capacity of gears. Factors studied include surface deformation, surface roughness, squeeze of films and viscoelasticity. (Author)

N64-16714
Stanford Research Inst., Menlo Park, Calif.
INVESTIGATION OF THE SPACE STORABILITY OF PRESSURIZING GASES. Final summary rept., 18 Feb 62-31 Dec 63
R. F. Muraca. 31 Dec 63, 18p
Contract NAS7-105
SRI Proj. PSU-4000; NASA CR-55841
OTS $1.60

DESCRIPTORS: Storage tanks, *Pressure vessels, *Gases, *Gas-generating systems, Attitude control systems, Hydrogen, Lithium compounds, Borohydrides,

Leather and Textiles

AD-424 863
Manchester Coll. of Science and Tech. (England).
MECHANICAL BEHAVIOUR OF TWISTED YARNS. I. FATIGUE BEHAVIOUR OF TWISTED CONTINUOUS FILAMENT YARNS. Final technical rept., Oct 62-Oct 63
A. J. Booth and J. W. S. Hearle. [1963] 109p
Contract DA91-591-EUC-1467
OTS $2.50

DESCRIPTORS: *Fibers, Processing, Mechanical properties, *Fatigue (Mechanics), Tensile properties, *Test equipment, Test methods

The second fatigue tester, was used, after minor modifications, to provide information of the fatigue behaviour of four textile materials at six ranges of twist and three stroke levels. Analysis of the results was split into three sections which deal respectively with the optical appearance of fractured specimens, the statistical nature of fatigue breakage, and the possibility of predicting fatigue failure by means of the known elastic recovery properties of the material. (Author) (See also AD-296 375)

AD-424 861
Manchester Coll. of Science and Tech. (England)
MECHANICAL BEHAVIOR OF TWISTED YARNS. 2. GEOMETRIC STRUCTURE AND FORM OF YARNS. Final technical rept., Oct 62-Oct 63
O. N. Bose and J. W. S. Hearle. [1963] 111p
Contract DA91-591-EUC-2706
OTS $2.50

DESCRIPTORS: *Fibers, Geometric forms, Processing, *Structural properties, Tensile properties, Test methods.

Investigations were made on the structure and form of yarns which do not twist as a cylindrical bundle. To understand the mechanism of ribbon form of twisting in actual yarns, ribbon of rubber filaments were twisted on model twisters and their cross-sections examined. The ideal wrapped ribbon structure, as assumed in the theoretical analysis was not obtained. Instead a collapsed wrapped structure is obtained. The theory of ribbon twisting was applied to determine the path of a filament in the yarn. When a spinning twist is present in the yarn, the filaments do not lie parallel to each other in the ribbon; the presence of a primary migratory cycle in the filament yarns has been explained to be due to the spinning twist. A mathematical relation was derived for the migration period of a filament assuming that spinning twist is present and the yarn has wrapped ribbon structure. In the final stages of this work, coloured layers of fibres and filaments were used to produce yarns on commerical twisting frames. The yarns were then observed under the microscope to show the extent to which wrapped ribbon structure is present in commercial yarns. (Author)

Plastics

TID-15763
Argonne National Lab., Ill.
LOW TEMPERATURE STORAGE OF EPOXY RESINS USED FOR EMBEDDING IN ELECTRON MICROSCOPY
O. T. Minick. Mar 62, 6p
Contract W31-109-eng-38
UAC-6222
OTS $1.10

DESCRIPTORS: *Plastics, Preparation,

AD-426 294
Atlantic Research Corp., Alexandria, Va.
DEVELOPMENT AND FIELD PRODUCTION OF FOAMED-IN-PLACE, PLASTIC, ENERGY-ABSORBING MATERIALS. Final rept., 31 Dec 56-31 Mar 61, on Aerial Delivery Equipment; and Field Production Equipment
N. D. Stewart, R. O. Thomas, S. V. Dubiel, J. A. Terek, and R. C. Bryant. [1961] 148p
Contracts DA19-129-QM-838, and DA19-129-QM-1257
OTS $2.75

DESCRIPTORS: *Packing materials, Air-drop operations, Landing impact, Absorption, *Shelters, *Thermal insulation, *Expanded plastics, *Isocyanate plastics, *Vegetable, Copolymerization, Sprays, Cold weather tests, Flame arresters,

Materials, methods, and equipment were investigated which would be suitable for the production in the field of foamed-in-place, plastic, energy-dissipating structures. These would later be assembled with aerial-drop containers. The resin system was to foam, cure, and develop the necessary energy-dissipating characteristics within 12 hours, without an accessory source of heat and under field conditions at ambient temperatures of 42° to 125°F. The energy-dissipating properties desired for the foams would be similar to those of foamed glass at comparable densities. Polyurethane systems were selected for the initial investigations. Also investigated

was the thermal balance of several highly exothermic foamed-in-place plastic systems, which might have application as energy absorbers and as flexible or rigid insulating materials. Exploratory trials to determine feasibility of foaming-in-place with some of these resin systems at arctic temperatures, -40 to -65°F, were carried out. It was necessary to devise, construct, and install an inexpensive but reliable instrument for measuring and comparing the energy-dissipating properties of the experimental foams. (Author) (See also PB-154 239)

AD-416 633
Denver Research Inst., Colo.
SYNTHESIS AND CHARACTERIZATION OF FLUORINE CONTAINING ULTRAVIOLET RADIATION ABSORBERS.
Final rept., 1 Jan 62-1 Jan 63, on Nonmetallic and Composite Materials
Don N. Gray. Apr 63, 133p
Contract AF33(616)8251
ASD-TDR-63-355
OTS $10.50

DESCRIPTORS: *Plastics, Stabilization, *Ultraviolet radiation, Absorption, Aromatic compounds, Polycyclic compounds, Ketones, Fluorides, Synthesis (Chemistry), Spectroscopy.

A series of fluro and trifluoromethyl substituted 2-hydroxy-4-methoxybenzophenones was synthesized in order to ascertain the effect of such substitution on the (a) spectral properties, and (b) evaporation rates as compared to 2-hydroxy-4-methoxybenzophenone, a commercially available and widely used ultraviolet absorber. Three of the six compounds chosen for the most intensive study were less volatile than either 2-hydroxy-4-methoxybenzophenone or 2, 4-dihydroxybenzophenone, and three were more volatile. The infrared, ultraviolet and nuclear magnetic resonance spectra of these compounds were obtained and are discussed. The three new ultraviolet absorbers, viz. 2-hydroxy-4-methoxy-2'-trifluoromethylbenzophenone, 2-hydroxy-4-methoxy-3'-fluorobenzophenone, and 2-hydroxy-4-methoxy-4'-fluorobenzophenone, with low evaporation rates have ultraviolet absorption spectra similar to 2-hydroxy-4-methoxybenzophenone. (Author)

TID-16307
Sandia Corp., Albuquerque, N. Mex.
SURFACE TREATMENTS FOR DIFFICULT TO BOND PLASTIC MATERIALS
N. J. De Lollis and O. Montoya. 27 Jul 62, 15p
Contract AT(29-1)789
SCDC-2721
OTS $1.60

DESCRIPTORS: *Polyethylene plastics, Surface properties

MATHEMATICS

TID-15843
Argonne National Lab., Ill.
SOME NEW TECHNIQUES OF NUMERICAL ANALYSIS
Henry C. Thacher, Jr. 27 Apr 62, 19p
Contract W31-109-eng-38
UAC-6385
OTS $1.60

DESCRIPTORS: Mathematics, *Numerical analysis

N64-13190
Computer Science Center, Univ. of Maryland, College Park.
ON SIEVES AND PRIMES
Sigekatu Kuroda and John Maryak. Oct 63, 14p
Grants NsG-398 and NSF P-1837
Technical rept. no. 63-2; NASA CR-55161
OTS $1.60

DESCRIPTORS: *Number theory.

NYO-10429
Courant Inst. of Mathematical Sciences, New York Univ., N. Y.
THE DEVELOPMENT AND USE OF METHODS OF LR TYPE
Beresford Parlett. 1 Jun 63, 47p
Contract AT(30-1)1480
OTS $4.60

DESCRIPTORS: Mathematics, *Quantum mechanics, *Matrix algebra

PB-165 301
Cruft Lab., Harvard Univ., Cambridge, Mass.
INTEGRAL TRANSFORMS FOR A CLASS OF TIME VARYING LINEAR SYSTEMS
K. S. Narendra. 20 Oct 60, 30p
Contract Nonr-1866(16)
Technical rept. no. 330; AD-247 120
OTS $2.60

DESCRIPTORS: *Integral transforms, Polynomials, Complex variables, Linear systems, Numerical methods and procedures, *Differential equations, Electrical networks, Servo systems, Synthesis, Control systems, *Dynamics.

An extension of the transform method to systems having parameters which vary with time is presented. By using the general L domain approach for the analysis and synthesis of linear time varying systems, a system function H(L) independent of time may be defined for the linear system. Such a system function has many of the advantages of that obtained for stationary systems using the Laplace transformation. By making H(L) a ratio of polynomials in the complex variable L, the Pole-Zero synthesis technique used for fixed systems may be applied to the time varying case. A building block for the synthesis of a class of time varying systems with exponentially varying coefficients is suggested. (Author)

PB-165 261
Delaware Univ., Newark.
QUASI-INTERIOR POINTS OF CONES. Technical rept. no. 2
R. E. Fullerton (Maryland Univ.) and C. C. Braunschweiger. Nov 63, 47p
Grants NSF-GP 223 and ONR 043-261
OTS $4.60

DESCRIPTORS: *Topology, *Convex sets, Operators (Mathematics), *Programming (Computers), Linear systems, Nonlinear systems.

A point $x \neq \theta$ belonging to a convex cone K with vertex θ in a locally convex linear topological space X is called a quasi-interior point (QI-point) of K if the linear extension of the set $K \cap (x - K)$ is dense in X. The set K_q of all quasi-interior points of K is called the quasi-interior of K. Many properties of QI-points and of cones with non-void quasi-interiors are determined. (Author)

NASA-TN-D-2141
Goddard Space Flight Center, National Aeronautics and Space Administration, Greenbelt, Md.
THE BACKWARD RECURRENCE METHOD FOR COMPUTING THE REGULAR BESSEL FUNCTION
Thomas E. Michels. Mar 64, 28p
N64-17724
OTS $0.75

IS-527
Institute for Atomic Research, Iowa State Univ. of Science and Tech., Ames.
LAURICELLA'S HYPERGEOMETRIC FUNCTION F_D
B. C. Carlson. 14 Aug 62, 28p
Contract W7405-eng-82
OTS $2.60

N64-16749
Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
THE APPLICATION OF LAMBERT'S THROREM TO THE SOLUTION OF INTERPLANETARY TRANSFER PROBLEMS
James F. Jordan. 1 Feb 64, 24p
Contract NAS7-100
Technical rept. no. 32-521; NASA CR-53084
OTS $2.60

DESCRIPTORS: *Interplanetary trajectories, Elliptical orbit trajectories, Space flight, Mathematical analysis.

PB-165 289
Kansas Univ., Lawrence.
ON RESTRICTIONS OF FUNCTIONS IN THE SPACES $P^{\alpha,p}$ AND $B^{\alpha,p}$. Technical rept. 5 (New Series)
P. Szeptycki. Feb 64, 10p
Grant NSF GP-439 and Contract Nonr-583(13)
OTS $1.10

DESCRIPTORS: Functions, Potential theory, *Bessel functions, Integral transforms, Matrix algebra, Theorems, *Functional analysis, Set theory.

A generalization of a result of Aronszajn and Smith concerning sections of exceptional sets for the spaces of Bessel potentials on R^n of L^2 functions and restrictions of functions in these spaces is given. (See also PB-148 585)

PB-165 288
Kansas Univ., Lawrence.
ON SPECTRAL REPRESENTATION FOR SELFADJOINT OPERATORS. EXPANSION IN GENERALIZED EIGENELEMENTS. Technical rept. 4 (New Series)
Eberhard Gerlach. Feb 64, 44p
Grant NSF GP-439 and Contract Nonr-583(13)
OTS $4.60

DESCRIPTORS: *Matrix algebra, Functions, Theorems, *Operators (Mathematics), Transformations (Mathematics), *Functional analysis.

The principal aim of the present paper is to give a supplement to the theory of spectral representation for selfadjoint operators in a separable Hilbert space. Various results in the classical theory hold (spectral measure)-almost everywhere, but the exceptional sets and the relations between them were not specified. A precise description of the exceptional set is given; the consequences of this description will be useful for questions of expansion in generalized eigenelements of A. In the remainder of the present paper the general results are applied to the problem of eigenfunction expansions in proper functional Hilbert spaces. (Author)

AD-423 898
Naval Ordnance Lab., White Oak, Md.
A NOTE ON BESSEL FUNCTIONS AND CONTINUED FRACTIONS
J. H. Eberly. Dec 63, 23p
NOLTR-63-228
OTS $0.75

DESCRIPTORS: *Bessel functions, *Continued fractions, Digital computers, Numerical analysis.

An identity, relating a certain infinite continued fraction to the ratio of two contiguous Bessel functions, is exploited to derive the representation of a single Bessel function in terms of a series of products of continued fractions. This representation is then made the basis of a new method for computing numerically Bessel functions of the first kind. The method is seen to be especially valuable in computing Bessel functions of order much larger than unity. (Author)

AD-427 355 repriced
Systems Research Labs., Inc., Dayton, Ohio.
RESEARCH ON RESIDUE NUMBER SERIAL COMPUTATION TECHNIQUES. Final technical rept., 15 Jun 62-15 Jun 63
C. Ross, C. K. Kim, R. E. Ihnot, and W. D. Markel. Nov 63, 233p
Contract AF33(657)8727, FR
RTD-TDR-63-4034
OTS $3.50

DESCRIPTORS: *Number theory, Complex numbers, *Computers, Algebra, Numerical analysis, Programming language, Matrix algebra, Networks, Numbers, *Arithmetic operations.

The purpose of the research performed was to investigate the techniques of serial computation utilizing modular arithmetic for the computer and its applications. Along with the feasibility of the serial computation itself, the problems of sign determination, magnitude determi-

nation, and moduli selection for a particular system of computation are investigated and the results derived from the research are given. Basic number theory is studied for further application of residue number theory. (Author)

Computing Devices

IS-698
Ames Lab., Iowa State Univ. of Science and Tech.
PROCESS SIMULATION ON A DIGITAL COMPUTER USING ANALOG METHODS
George J. Farris and Lawrence E. Burkhart. 10 Jul 63, 26p
Contract W7405-eng-82
CONF-110-1
OTS $2.60

DESCRIPTORS: *Chemical engineering, Digital computers, *Programming (Computers).

Annual Meeting of the American Institute of Chemical Engineers, Houston, Texas, Dec 63

N64-16753
Computer Science Center, Univ. of Maryland, College Park.
MOIST: MARCO OUTPUT INPUT SYSTEM FOR THE IBM 7090
Gerald M. Berns (IBM). Jan 64, 48p
Grant NsG-398
Technical rept. TR-64-5; NASA CR-53080
OTS $4.60

DESCRIPTORS: Computers, *Programming (Computers) *Input-output devices, Coding, Instruction manuals.

NASA-TN-D-2257
Goddard Space Flight Center, National Aeronautics and Space Administration, Greenbelt, Md.
CODING AN ANALOG VARIABLE FOR CONSTANT PERCENTAGE ERROR
Rodger A. Cliff. Mar 64, 20p
N64-17727
OTS $0.75

LAMS-3027
Los Alamos Scientific Lab., N. Mex.
AN EXAMINATION OF A MODEL OF A SEARCH BY THE SENSE OF "SMELL"
M. H. Goldhaber. Sep 63, 24p
Contract W7405-eng-36
OTS $0.50

AD-419 160
Training Research Lab., Univ. of Illinois, Urbana.
TEACHING MACHINES AND COMPUTER-BASED SYSTEMS. Technical rept. no. 1, on Research on Pre-Programed Self-Instruction and Self-Programed Individualized Education
Lawrence M. Stolurow and Daniel J. Davis. Aug 63, 54p
Contract Nonr 3985(04)
OTS $5.60

DESCRIPTORS: *Teaching machines, *Training devices, Programming (Computers), *Education, Effectiveness, Analysis.

The purpose of this paper is to develop a general model of the teaching process as accomplished by an adaptive teaching machine system. No attempt is made to completely inventory existing equipment or to describe particular machines in great detail. (Author)

MECHANICS

AD-427 919 repriced
Fracture Research Lab., Univ. of Illinois, Urbana.
CYCLIC STRAIN ACCUMULATION UNDER COMPLEX MULTIAXIAL LOADING. Rept. for Apr 61-Jun 63, on Metallic Materials
G. J. Moyar and G. M. Sinclair. Dec 63, 45p
Contract AF33(616)8177
RTD-TDR-63-4120; N64-14653
OTS $1.25

DESCRIPTORS: *Copper, *Pipes, Deformation, Stresses, Strain (Mechanics). Creep, Plasticity, Theory, Loading (Mechanics). Shear stresses, Fatigue (Mechanics), Fracture (Mechanics), Mathematical analysis.

When a tubular specimen of copper is subjected to a small steady tension and alternating torsion at room temperature large axial strain increments accumulate on a cyclic basis. At relatively low values of axial stress a steady state cyclic strain accumulation is observed to develop. The strains and cyclic strain rates which are observed are many orders of magnitude greater than corresponding values obtained under conditions of standard static creep tests performed at the same peak effective stress. They are also many larger than those obtained due to simple repetition of the effective stress in more conventional dynamic creep tests. The experiments reported herein were designed to produce an extreme case of cyclic creep wherein time and temperature dependence are minimized. The analysis of results includes a comparison with plasticity theory predictions as well as a parametric description of minimum cyclic creep rate. (Author)

TID-16555
Georgia Inst. of Tech., Atlanta.
THE PROBLEM OF PNEUMATIC PRESSURE LAG: PART I. STEADY STATE FLOW IN A TUBING SYSTEM
Arnold L. Ducoffe and Frank M. White, Jr. Jul 62, 39p
Contract AT(29-1)789
SCDC-2744
OTS $3.60

DESCRIPTORS: *Fluid flow, *Laminar flow, Turbulence, Pressure

N64-15790
Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
THE FREE-PISTON SHOCK TUBE DRIVER: A PRELIMINARY THEORETICAL STUDY
Gerald A. Roffe. 15 Dec 63, 21p.
Contract NAS7-100
Technical rept. no. 32-560; NASA-CR-53059
OTS $2.60

DESCRIPTORS: *Pistons, *Shock tubes, *Gas flow, Compressive properties, Enthalpy, Equations of motion,

UCRL-13042(Rev.)
[Lawrence Radiation Lab.] Univ. of California, Berkeley.
STRESS-STRAIN DISTRIBUTION DURING TRANSIENT HEATING OF A TRANSVERSELY ANISOTROPIC MATER
Bob H. Suzuki (Boeing Co.) and J. Frisch. 30 Jun 62, 38p
Contract W7405-eng-48
OTS $3.60

DESCRIPTORS: *Graphite, *Thermal stresses

CONF-152-1
Lawrence Radiation Lab., Univ. of California, Livermore.
IMPACT CALIBRATION OF ACCELEROMETERS USING THE HOPKINSON BAR TECHNIQUE
G. W. Brown. [1962] 9p
Contract AT(29-1)789
SCDC-3322
OTS $1.10

DESCRIPTORS: *Accelerometers, Calibration.

Interagency Mechanical Operations Group, Subgroup on Environmental Testing Meeting No. 4, Livermore, Calif., Mar 63

NASA-TN-D-2260
Lewis Research Center, National Aeronautics and Space Administration, Cleveland, Ohio
ELASTIC STRESS DISTRIBUTION IN A FINITE-WIDTH ORTHOTROPIC PLATE CONTAINING A CRACK
Alexander Mendelson and Samuel W. Spero. Mar 64, 18p
N64-17161
OTS $0.50

DESCRIPTORS: *Elasticity, *Stresses, Distribution, Sheets, *Fractures (Mechanics), Integral transforms, Numerical analysis.

Aerodynamics and Pneumatics

PB-165 285
Aerospace Corp., El Segundo, Calif.
CONFINED VORTEX FLOWS WITH BOUNDARY-LAYER INTERACTION
M. L. Rosenzweig, W. S. Lewellen, and D. H. Ross. 20 Feb 64, 58p
Rept. no. ATN-64(9227)-2
OTS $5.60

DESCRIPTORS: *Vortices, *Fluid flow, Incompressible flow, Hilsch tubes, *Boundary layer, Reynolds number, Equations, Numerical analysis, Axially symmetric flow.

Axisymmetric flow of an incompressible fluid in a right-cylindrical vortex tube bounded by planar end walls is considered. The mutual interaction of the primary vortex flow field and the end-wall boundary layers is studied by relating the stream function and circulation in these regions. An interaction parameter is defined which determines the magnitude of the influence of the boundary layers on the circulation and mass-flow distributions in the primary flow. These distributions are obtained numerically, primarily as functions of the interaction parameter and the Reynolds number based on the radial flow. Experimental results are interpreted in the light of this theory, and it is concluded that substantial turbulence levels (though somewhat less than estimates made without consideration of boundary layer effects) must be assumed to explain the experimental results. (See also PB-165-276)

PB-165 276
Aerospace Corp., El Segundo, Calif.
AN EXPERIMENTAL STUDY OF SECONDARY FLOW IN JET-DRIVEN VORTEX CHAMBERS
D. H. Ross. 27 Jan 64, 56p
Rept. no. ATN-64(9227)-1
OTS $5.60

DESCRIPTORS: *Vortices, *Fluid flow, Jet propulsion, Hilsch tubes, Fluid dynamic properties, Tests, Axially symmetric flow.

A series of flow visualization experiments was conducted to obtain a qualitative picture of the flow and the effects of changes in geometry and flow parameters. A transparent vortex chamber and selective dye injection into the water-working fluid were utilized. Interest centered on changes in the surface and shape of the end walls and on the exit hole. A form of end-wall-boundary-layer slot blowing was effective in altering the secondary flow pattern. An approximate analysis is made to determine the effect of non-planar end-walls on boundary layer radial mass flow, based on the G. I. Taylor result for a conical swirl flow. (Author)

NASA-TR-R-193
Ames Research Center, National Aeronautics and Space Administration, Moffett Field, Calif.
SHOCK-LAYER RADIATION OF BLUNT BODIES AT REENTRY VELOCITIES
William A. Page and James O. Arnold. Apr 64, 45p
N64-17829
OTS $1.25

NASA-TN-D-2230
Ames Research Center, National Aeronautics and Space Administration, Moffett Field, Calif.
MEASUREMENT OF HEAT TRANSFER AND RECOVERY FACTOR OF A COMPRESSIBLE TURBULENT BOUNDARY LAYER ON A SHARP CONE WITH FOREIGN GAS INJECTION
C. C. Pappas and Arthur F. Okuno. Apr 64, 86p
N64-17827
OTS $2.25

PB-165 272
Firestone Flight Sciences Lab., Calif. Inst. of Tech., Pasadena.
SUPERSONIC SEPARATED AND REATTACHING LAMINAR FLOWS: I. GENERAL THEORY AND APPLICATION TO ADIABATIC BOUNDARY LAYER-SHOCK WAVE INTERACTIONS. Technical rept. no. 3, on Separated Flows Research Project
Lester Lees and Barry L. Reeves. 4 Oct 63, 81p
Grant AF-AFOSR-54-63
OTS $8.10

DESCRIPTORS: *Laminar boundary layer, *Shock waves, Fluid flow, Supersonic flow, Adiabatic gas flow, Fluid dynamic properties, Numerical analysis, *Laminar flow,

This report deals with laminar boundary layer-shock wave interactions in which the pressure rise generated in an "external" supersonic, inviscid flow is communicated upstream through the boundary layer, and thereby induces flow separation. In order to describe this phenomenon approximately, including the subsequent reattachment of the flow, use is made of an integral or moment method in which the first moment of momentum is employed, in addition to the usual momentum integral (zeroth moment). By this means the velocity and enthalpy profiles are characterized by a single independent parameter not explicitly related to to local static pressure gradient. This method itself is not new, but it turns out that its successful application to separated and reattaching flows hinges on the proper choice of the one-parameter family of velocity profiles utilized to represent the integral properties of the viscous flow. It is shown that the Stewartson reversed-flow profiles and their Cohen-Reshotko analogues for flows with heat transfer have the qualitatively correct behavior; polynomials do not. (Author)

PB-165 264
Institute of Research Lehigh Univ., Bethlehem, Pa.
A STUDY OF THE WALL BOUNDARY CONDITION AND MICROSCOPIC FLUCTUATIONS IN LAMINAR PIPE FLOW BY TRACER PHOTOGRAPHY.
Technical rept. no. 17
Richard M. Elrick, II. Doctoral thesis. 1 Oct 63, 104p
Grant NSF-19713
N64-11301
OTS $9.10

DESCRIPTORS: *Laminar flow, *Gas flow, Pipes, Oscillation, Surface area, Smokes, Photographic analysis.

A high precision, high resolution tracer technique was used to study low noise, steady laminar air flow in a 1-1/2 inch by 1/2 inch rectangular pipe. The tracers were sub-micron size cigarette smoke particles which were injected into the flow and illuminated by chopping light from a carbon arc lamp which allowed their trajectories to be photographed. Photography on moving film in the image plane of the microscope camera permitted extension of the flow regions which could be examined and increased both the accuracy and duration of the observations. (Author)

NASA-TN-D-2193
Langley Research Center, National Aeronautics and Space Administration, Langley Station, Va.
EFFECTS OF LAMINAR-BOUNDARY-LAYER DISPLACEMENT ON A HEMISPHERE IN HELIUM FLOW
Davis H. Crawford. Apr 64, 26p
N64-17813
OTS $0.75

NASA-TN-D-2221
Langley Research Center, National Aeronautics and Space Administration, Langley Station, Va.
IDEAL-GAS TABLES FOR OBLIQUE-SHOCK FLOW PARAMETERS IN AIR AT MACH NUMBERS FROM 1.05 TO 12.0
John S. Dennard and Patricia B. Spencer. Mar 64, 158p
N64-17160
OTS $3.00

DESCRIPTORS: *Gases, *Shock waves, *Supersonic flow, Equations, Programming (Computers), Aerodynamic characteristics, *Tables.

NASA-TN-D-2182
Langley Research Center, National Aeronautics and Space Administration, Langley Station, Va.
INDUCED PRESSURES AND SHOCK SHAPES ON BLUNT CONES IN HYPERSONIC FLOW
Richard D. Wagner, Jr., and Ralph Watson. Mar 64, 27p
N64-17158
OTS $0.75

DESCRIPTORS: *Blunt bodies, *Hypersonic flow, Pressure, *Shock waves, Geometric forms, Numerical analysis, Correlation techniques.

NASA-TN-D-2190
Langley Research Center, National Aeronautics and Space Administration, Langley Station, Va.
SUPERSONIC LONGITUDINAL STABILITY CHARACTERISTICS OF THE TWO FINAL STAGES OF A FOUR-STAGE LAUNCH VEHICLES
Royce L. McKinney. Mar 64, 21p
N64-17159
OTS $0.50

DESCRIPTORS: *Launch vehicles (Aerospace), *Stabilization systems, Supersonic characteristics, Model tests, Wind tunnels.

PB-165 291
Princeton Univ., N. J.
AERODYNAMIC CHARACTERISTICS OF HELICOPTER ROTORS. ROTOR CONTRIBUTIONS TO HELICOPTER STABILITY PARAMETERS
Edward Seckel and H. C. Curtiss, Jr. Dec 63, 60p
Rept. no. 659
OTS $5.60

DESCRIPTORS: *Helicopter rotors, *Aerodynamic characteristics, Stabilization systems, Equations, Theory, Numerical analysis

Theoretical expressions are derived for the aerodynamic forces on a helicopter rotor, and for their contributions to various stability derivatives. The resulting expressions are tabulated, containing a number of functions of advance ratio which are presented graphically. Offset hinges and pitch-flap coupling are provided for in the formulation. A novel method for trim calcution is presented. The theory is based on the original results of Bailey (NACA TR-716, 1941). It involves some changes in notation, axes, assumptions, and the structure of formulas to widen their scope and improve their convenience for stability estimates. Discussion of the limiting assumptions is offered. (Author)

METALLURGY

IS-513
Ames Lab., Iowa State Univ. of Science and Tech.
MAGNETICALLY DILUTE ALLOYS, RARE-EARTH METALS, AND SUPERCONDUCTIVITY. Rept. on Magnetic Materials Digest 1961.
Sam Legvold. [Jul 62] 13p
Contract W7405-eng-82
OTS $1.60

DESCRIPTORS: *Transition elements, *Rare earths, *Bibliographies, Magnetic properties

WAPD-T-1433
Bettis Atomic Power Lab., Pittsburgh, Pa.
HARDNESS CONVERSION RELATIONSHIPS FOR HAFNIUM
J. G. Goodwin. 28 Mar 62, 6p
Contract AT(11-1)GEN-14
OTS $1.10

DESCRIPTORS: *Hafnium, *Hardness.

WAPD-T-1431
Bettis Atomic Power Lab., Pittsburgh, Pa.
THE TENSILE PROPERTIES OF COLD-ROLLED AND ANNEALED HAFNIUM
J. G. Goodwin. 5 May 62, 38p
Contract AT(11-1)GEN-14
OTS $3.60

DESCRIPTORS: *Hafnium, *Tensile properties.

BBC-119
Brush Beryllium Co., Cleveland, Ohio.
RESEARCH ON MODIFIED BERYLLIDES AS HIGH-TEMPERATURE NUCLEAR MATERIALS. Quarterly progress rept. for 1 Mar-31 May 63
R. M. Paine, A. J. Stonehouse, and W. W. Beaver. 30 Jun 63, 16p
Contract AT(33-3)20
OTS $1.60

DESCRIPTORS: *Beryllium alloys, *Zirconium alloys,

AD-425 604
Defense Metals Information Center, Columbus, Ohio.
THE CURRENT STATUS AND 1970 POTENTIAL OF SELECTED DEFENSE METALS. 31 Oct 63, 47p
Contract AF33(616)7747
DMIC Memo. 183; N64-12249
OTS $1.25

DESCRIPTORS: *Beryllium, *Cobalt, *Niobium, *Molybdenum, *Nickel, *Tantalum, *Titanium, *Tungsten, Alloys, *Steel, *Stainless steel, *Refractory metals, Refractory coatings, Reviews,

Summaries are given concerning current alloys, major current defense uses, current emphasis in research and development, and future potential of the following metals: Be, Co, Nb, Mo, Ni, Ta, Ti, W, and high-strength and stainless steels. A consideration of coatings for refractory metals is appended.

CONF-39-35
Edgerton, Germeshausen and Grier, Inc., Boston, Mass.
GROUND ROUGHNESS EFFECTS ON THE ENERGY AND ANGULAR DISTRIBUTION OF GAMMA RADIATION FROM FALLOUT
Q. G. Klingler. [1962] 22p
Contract AT(29-1)1183
OTS $2.60

DESCRIPTORS: *Gamma rays, *Radioactive fallout, Terrain

American Nuclear Society Annual Meeting, Salt Lake City, Utah, Jun 63

CONF-39-43
General Electric Co., Cincinnati, Ohio.
EFFECT OF TEST ATMOSPHERE ON STRESS-RUPTURE AND CREEP PROPERTIES OF MOLYBDENUM AT 2200° C
J. B. Conway, P. N. Flagella, D. G. Salyards, and W. L. McCullough. [1963] 24p
Contract AT(11-1)171
TM-63-6-3
OTS $2.60

DESCRIPTORS: *Molybdenum, Creep, Stresses.

American Nuclear Society Meeting, Salt Lake City, Utah, Jun 63

CONF-94-4
General Electric Co., Cincinnati, Ohio.
STRESS-RUPTURE AND CREEP PROPERTIES OF REFRACTORY METALS TO 2800°C
J. B. Conway, D. G. Salyards, W. L. McCullough, and P. N. Flagella. [1962] 23p
Contract AT(11-1)171
TM-63-4-12
OTS $2.60

DESCRIPTORS: *Heat-resistant metals and alloys, Stresses, Creep

American Nuclear Society Meeting, Cincinnati, Apr 63.

UCRL-7559
Lawrence Radiation Lab., Univ. of California, Livermore.
SOME KINETIC AND THERMODYNAMIC PROPERTIES OF THE REFRACTORY METAL BORIDES AND NITRIDES. AN ANNOTATED BIBLIOGRAPHY.
M. Temple Milliken and Jean E. Senkin, comp.
Sep 63, 345p
Contract W7405-eng-48
OTS $4.50

DESCRIPTORS: *Heat-resistant metals and alloys, *Borides, *Nitrides, Thermodynamics, *Bibliographies.

LADC-5428
Los Alamos Scientific Lab., N. Mex.
CONCERNING THE EVIDENCE FOR THE EXISTENCE OF THE HIGH-TEMPERATURE γ' -PHASE OF CERIUM
Karl A. Gschneidner, Jr. and James T. Waber.
[21 Aug 62] 21p
Contract W7405-eng-36
OTS $2.60

DESCRIPTORS: *Cerium, *Phase studies

LADC-5330
Los Alamos Scientific Lab., N. Mex.
THE MECHANICAL PROPERTIES OF ALPHA PLUTONIUM IN COMPRESSION
S. E. Bronisz. [22 Aug 62] 23p
Contract W7405-eng-36
OTS $2.60

DESCRIPTORS: *Plutonium, *Mechanical properties,

LADC-5380
Los Alamos Scientific Lab., N. Mex.
PREDICTION OF SOLID SOLUBILITY IN METALLIC ALLOYS
James T. Waber, Karl Gschneidner, Jr., Allen C. Larson, and Margaret Y. Prince. [1962] 34p
Contract W7405-eng-36
OTS $3.60

DESCRIPTORS: *Alloys, *Solids, *Solutions.

PB-171 809-5
Martin [Marietta Corp.] Denver, Colo.
CRYOGENIC MATERIALS DATA HANDBOOK. Progress rept. no. 13 [on Materials Application]
F. R. Schwartzberg, S. H. Osgood, and R. D. Keys.
15 Jul 63, 132p
Contract AF33(657)9161
OTS $2.00

DESCRIPTORS: *Cryogenics, Materials, *Low-temperature alloys, *Aluminum alloys, *Cobalt alloys, *Stainless steel, *Nickel alloys, *Titanium alloys, Mechanical properties, *Handbooks,

The document is comprised of inserts for the basic Cryogenic Materials Handbook, PB-171 809 (See also PB-171 809-4)

PB-181 671
Martin [Marietta Corp.] Denver, Colo.
CRYOGENIC MATERIALS DATA HANDBOOK. Yearly summary rept., Jun 62-Jun 63, on Materials Application
F. R. Schwartzberg, S. H. Osgood, and R. D. Keys.
Sep 63, 11p
Contract AF33(657)9161
OTS $0.50

DESCRIPTORS: *Cryogenics, Materials, *Low-temperature alloys, Documentation, *Handbooks,

The background, organization, and maintenance of the Cryogenic Materials Data Handbook are discussed. An experimental program and its accomplishments in the past year are described. Handbook insert reports 12 and 13 were distributed in the past year. A new format for data presentation was introduced. Data included both original experimental results obtained under this contract and information from the literature. (Author)
(See also PB-171 809-5)

CONF-94-5
Oak Ridge National Lab., Tenn.
JOINING OF EXOTIC MATERIALS
G. M. Slaughter. [1963] 2p
Contract W7405-eng-26
OTS $1.10

DESCRIPTORS: *Niobium, *Niobium alloys, Beryllium, Graphite, *Welding, *Brazing, *Heat-resistant metals and alloys.

American Nuclear Society Meeting, Cincinnati, Apr 63

AD-424 466
Rock Island Arsenal, Ill.
BEHAVIOR OF ORGANIC STRESS PREVENTING AGENTS IN NICKEL PLATING SOLUTIONS. Technical rept.
Stanley L. Eisler. 14 Oct 63, 18p
Rept. no. 63-3346; N64-13311
OTS $0.75

DESCRIPTORS: *Nickel, *Electrodeposition, *Metal coatings, Stresses, Inhibition, Additives, Organic compounds, Polycyclic compounds, Organic sulfur compounds, Organic nitrogen compounds, Anhidrides.

Two organic stress relieving agents, naphthalene 1, 3, 6 trisulfonic acid and saccharin were tested at three concentrations each in a nickel sulfamate plating bath by using a radioactive tag to determine the amount of the agent deposited with the plate. Tests were conducted at temperatures of 90, 110 and 130°F and current densities of 20, 40, 60 and 80 amperes per ft^2. The amount deposited varied directly with concentration and indirectly with current density. It was also found that there was a relationship between the amount of the additive deposited and the compressive stress results taken from the literature. (Author)

TID-16475
Savannah River Lab., Aiken, S.C.
METALLOGRAPHIC PREPARATION OF ZIRCALOY
M. R. Louthan, Jr. and C. E. Padgett. 30 Aug 62, 6p
Contract AT(07-2)1
OTS $1.10

DESCRIPTORS: *Metallography, *Zirconium alloys,

AD-421 905
Universal-Cyclops Steel Corp., Bridgeville, Pa.
THE STATE-OF-THE-ART OF WELDING OF REFRACTORY METALS. Summary rept.
D. J. Seman and F. D. Seaman. Jun 63, 114p
Contract NOw 63-0043-c
OTS $2.50

DESCRIPTORS: *Welding, Reviews, *Refractory metals, *Molybdenum, *Niobium, *Tungsten, *Tantalum, Arc welding, Resistance welding, Electron beams, Ultrasonic radiation, Flash welds, Spot welds.

The document includes a literature and industrial "state-of-the art" survey of refractory metal welding. The report (1) summarizes the number and types of facilities engaged in refractory metal welding, (2) summarizes the nature of refractory metal welding, and (3) projects the current methods and limitations in terms of future needs. (Author)

Ferrous Metals

BNL-6249
Brookhaven National Lab., Upton, N. Y.
THE MECHANICAL PROPERTIES OF IRRADIATED IRON AND IRON ALLOYS
J. G. Y. Chow, S. B. McRickard, and D. H. Gurinsky.
6 Sep 62, 56p
Contract AT(30-2)GEN-16
OTS $5.60

DESCRIPTORS: *Iron, *Iron alloys, *Radiation effects, Mechanical properties

AD-425 948
Defense Metals Information Center, Columbus, Ohio.
HOT-COLD WORKING OF STEEL TO IMPROVE STRENGTH
Charles W. Marschall. 11 Oct 63, 76p
Contract AF33(616)7747
DMIC rept. 192; N64-13672
OTS $2.00

DESCRIPTORS: *Steel, *Austenite, Deformation, Hot working, Cold-working, Tensile properties, Ductility, Hardness, Toughness, Transition temperature, Fatigue (Mechanics), Transformations, Recrystallization, Microstructure, Reviews,

Results are reported of a survey of the world literature and of discussions with researchers concerning the effects of "hot-cold working" (Ausforming) on the strength, ductility, hardness, notch strength, toughness, transition temperature, retained austenite, fatigue strength, directionality, transformation kinetics, recrystallization kinetics, and microstructure of steel. A bibliography of 95 items is included.

AD-423 526
Naval Research Lab., Washington, D. C.
NEUTRON EMBRITTLEMENT OF REACTOR PRESSURE VESSEL STEELS
L. E. Steele and J. R. Hawthorne. 22 Oct 63, 39p
NRL rept. 5984; N64-12260
OTS $1.00

DESCRIPTORS: Nuclear reactors, *Pressure vessels, *Steel, *Neutron reactions, *Radiation damage, Brittleness, Analysis, Reactor materials,

This report presents the status of observations at the U. S. Naval Research Laboratory on the embrittlement of steels which are commonly used for the primary pressure containment vessels of nuclear power plants. The deomonstrated criterion of nil ductility transition (NDT) temperature provides the basis for meaningful analysis of neutron-induced embrittlement in reactor steels. Results to date indicate that the degree of embrittlement depends upon the material, the neutron exexposure, and the temperature during irradiation. These same variables also affect the degree of notch ductility recovery effected by postirradiation heat treatment. In addition, the time and temperature of heat treatment have been shown to play an important role in establishing the recovery pattern. The validity of these experimental observations are being tested through correlations with data from reactor surveillance programs and from specimens of the SL-1 reactor pressure vessel. Preliminary data from dosimetry in the SM-1A reactor permit the extension of experimental data to predict the increase in NDT of the reactor pressure vessel. (Author)

Light Metals

AD-421 029
Defense Metals Information Center, Columbus, Ohio.
THE STATUS AND PROPERTIES OF TITANIUM ALLOYS FOR THICK PLATE
G. E. Faulkner, W. J. Lewis, and D. C. Martin.
14 Jun 63, 51p
Contract AF33(616)7747
DMIC rept. 185
OTS $1.50

DESCRIPTORS: *Titanium alloys, *Metal plates, *Ship plates, *Armor plates, Production, *Welding, Machining, Material forming, Tensile properties, Fracture (Mechanics), Toughness, Compressive properties, Submarine hulls, Armored vehicles, Rocket cases,

The report (1) describes the metallurgical characteristics of titanium alloys, and relates titanium's character to thick-plate applications, (2) summarizes current knowledge about the mechanical properties of titanium alloys in thickplate form, (3) discusses the weldability of titanium alloys in terms of the thick-plate application, and (4) outlines briefly the status of present knowledge about fabricating thick plates of titanium alloys. (Author)

UCRL-11160
Lawrence Radiation Lab., Univ. of California, Berkeley.
EFFECT OF POLYSLIP ON STRAIN-HARDENING IN ALUMINUM SINGLE CRYSTALS
J. D. Mote. Doctoral thesis. 14 Feb 64, 32p
Contract W7405-eng-48
OTS $0.75

DESCRIPTORS: *Aluminum, *Crystal lattice defects, Hardening.

NMI-TJ-54
Nuclear Metals, Inc., West Concord, Mass.
THE EFFECT OF ZONE REFINING ON THE PURITY AND MECHANICAL PROPERTIES OF BERYLLIUM SINGLE CRYSTALS
D. F. Kaufman, E. D. Levine, J. J. Pickett, and L. R. Aronin. 7 Aug 63, 32p
Contract AT(30-1)1565
CONF-170-1
OTS $3.60

DESCRIPTORS: *Beryllium, *Crystals, *Mechanical properties.

Conference on the Physical Metallurgy of Beryllium, Gatlinburg, Tenn., Apr-May 63

Nonferrous (except light) Metals

AD-423 952
Defense Metals Information Center, Columbus, Ohio.
THE EFFECT OF FABRICATION HISTORY AND MICROSTRUCTURE ON THE MECHANICAL PROPERTIES OF REFRACTORY METALS AND ALLOYS
A. G. Imgram and H. R. Ogden. 10 Jul 63, 70p
Contract AF33(616)7747
DMIC rept. 186; N64-13970
OTS $1.75

DESCRIPTORS: *Refractory metals, *Niobium, *Tantalum, *Molybdenum, *Tungsten, Refractory metal alloys, *Material forming, Mechanical properties, Microstructure, *Grain structures (Metallurgy), Impurities, Solid solutions

The report summarizes the present knowledge concerning the relationship among fabrication history, metallurgical structure, and the mechanical properties of the refractory metals columbium, tantalum, molybdenum, and tungsten, and their alloys. The report is organized into three main sections, titled "Fabrication", "Microstructure and Alloying", and "Interstitial Impurities". The data presented were selected as those which best illustrate the topics discussed. Descriptions of the metallurgical principles involved are included. Suggestions for optimizing mechanical properties by controlling metallurgical structure are made where possible. (Author)

AD-426 255
Defense Metals Information Center, Columbus, Ohio.
THE ENGINEERING PROPERTIES OF COLUMBIUM AND COLUMBIUM ALLOYS
F. F. Schmidt and H. R. Ogden. 6 Sep 63, 242p
Contract AF33(616)7747
DMIC rept. 188; N64-13301
OTS $3.50

DESCRIPTORS: *Refractory metals, *Niobium, Refractory metal alloys, *Niobium alloys, *Zirconium alloys, *Vanadium alloys, *Hafnium alloys, *Tantalum alloys, *Titanium alloys, *Tungsten alloys, *Molybdenum alloys, Physical properties, Mechanical properties, Metallurgy, Tables, Reviews.

The report presents the results of a state-of-the-art survey covering columbium and 18 of its most promising alloys. All data are given in tabular and graphical form covering some of the more important physical, mechanical, and metallurgical properties for each material. References are given at the conclusion of each material section. The alloys considered are: Nb-1Zr; -5Zr; -5V; -10Hf-1Ti-0.5Zr; -10Ta-1W; -28Ta-10W-1Zr; -33Ta-1Zr; -10Ti-5Zr; -10Ti-10Mo-0.1C; -5W-1Zr; -10W-1Zr-0.1C; -10W-2.5Zr; -10W-10Hf; -15W-5Mo-1Zr; -15W-5Mo-5Ti-1Zr; -20W-1Zr; -20W-10Ti-6Mo-; -5V-5Mo-1Zr.

AD-426 264
Defense Metals Information Center, Columbus, Ohio.
THE ENGINEERING PROPERTIES OF MOLYBDENUM AND MOLYBDENUM ALLOYS
F. F. Schmidt and H. R. Ogden. 20 Sep 63, 288p
Contract AF33(616)7747
DMIC rept. 190; N64-13671
OTS $4.00

DESCRIPTORS: *Refractory metals, *Molybdenum, Refractory metal alloys, *Molybdenum alloys, *Niobium alloys, *Zirconium alloys, *Titanium alloys, *Tungsten alloys, Metallurgy, Mechanical properties, Physical properties, Tables, Reviews.

The report presents the results of a state-of-the-art survey covering molybdenum and nine of its most promising alloys. All data are given in tabular and graphical form covering some of the more important physical, mechanical, and metallurgical properties for each material. References are given at the conclusion of each material section. Alloys considered are: Mo-1.5 Nb; - 0.05Zr; - 0.5 Zr; - 0.5 Ti; - 0.5 Ti - 0.08 Zr - 0.03C; - 1.2 Ti - 0.25 Zr - 0.15C; -25W-0.1Zr - 0.03C; -30W; 50W.

AD-426 344
Defense Metals Information, Columbus, Ohio.
THE ENGINEERING PROPERTIES OF TANTALUM AND TANTALUM ALLOYS
F. F. Schmidt and H. R. Ogden. 13 Sep 63, 118p
Contract AF33(616)7747
DMIC rept. no. 189; N64-13832
OTS $2.50

DESCRIPTORS: *Refractory metals, *Tantalum, Refractory metal alloys, *Tantalum alloys, Tungsten alloys, Niobium alloys, Vanadium alloys, Hafnium alloys, Molybdenum alloys, Physical properties, Mechanical properties, Metallurgy, Tables, Reviews, Bibliographies.

The report presents the results of a state-of-the-art survey covering tantalum and seven of its alloys. All data are given in tabular and graphical form covering some of the more important physical, mechanical, and metallurgical properties for each material. References are given at the conclusion of each material section. The alloys considered are: Ta-10W; Ta-12.5W; Ta-30Nb-7.5V; Ta-5W-2.5Mo; Ta-8W-2Hf; Ta-10W-2.5Hf; Ta-10W-2.5Mo.

AD-425 547
Defense Metals Information Center, Columbus, Ohio.
THE ENGINEERING PROPERTIES OF TUNGSTEN AND TUNGSTEN ALLOYS
F. F. Schmidt and H. R. Ogden. 27 Sep 63, 136p
Contract AF33(616)7747
DMIC rept. 191; N64-13839
OTS $2.75

DESCRIPTORS: *Refractory metals, *Tungsten, Refractory metal alloys, *Tungsten alloys, *Niobium alloys, *Molybdenum alloys, *Rhenium alloys, Solid solutions, Tantalum compounds, Carbides, Thorium compounds, Oxides, Metallurgy, Mechanical properties, Physical properties, Tables, Reviews.

This report presents the results of a state-of-the-art survey covering tungsten and ten of its alloys. All data are given in tabular and graphical form covering some of the more important physical, mechanical, and metallurgical properties for each material. References are given at the conclusion of each material section. The alloys considered are: "doped" tungsten; W-0.38TaC;-1ThO_2;-2ThO_2;-0.6Nb;-2Mo;-15Mo;-3Re;-5Re;-26Re.

AD-425 922
Defense Metals Information Center, Columbus, Ohio
SHORT-TIME TENSILE PROPERTIES OF THE Co-20Cr-15W-10Ni COBALT-BASE ALLOY (L-605)
C. J. Slunder. 27 Sep 63, 141p
Contract AF33(616)7747
DMIC Memo. 179
OTS $2.75

DESCRIPTORS: *Cobalt alloys, *Chromium alloys, *Tungsten alloys, *Nickel alloys, *Welds, Brazing, Tensile properties, Tables, Reviews

A compendium of available data is given concerning the tensile properties of Haynes Alloy No. 25 (Co-20Cr-15W-10Ni) at room-temperature, short-time elevated temperatures (75-2400°F), and cryogenic temperatures. Consideration is also given to the tensile properties of welded and brazed joints of the alloy.

AD-425 474
Defense Metals Information Center, Columbus, Ohio.
TUNGSTEN RESEARCH AND DEVELOPMENT REVIEW, 1960-1962
J. L. Ratliff, W. A. Gibeaut, and H. R. Ogden.
23 Oct 63, 56p
Contract AF33(616)7747
DMIC rept. 193; N64-13845
OTS $1.50

DESCRIPTORS: *Refractory metals, *Tungsten, Tungsten alloys, Powder metallurgy, Melting, Casting, Vapor plating, Extrusion, Forging, *Material forming, Machining, *Rocket motor nozzles, *Joining, Welding, Brazing, Bonding, *Corrosion, Erosion, Oxidation, *Refractory coatings, Metallurgy, Reviews,

Government-sponsored tungsten research and development efforts encompass a broad range of technological activities. Typifying the extreme limits of efforts since January, 1960, studies have ranged from preparation of unalloyed metal to development of high-integrity fabricated shapes of tungsten-base materials. The nine major areas of research are summarized within the report by brief technical discussions of 104 separate studies on 79 research programs. Based upon this review of tungsten research and development, it can be concluded that a well-balanced over-all program was developed and pursued during the period 1960 - 1962 and now continues. (Author)

AD-427 343 repriced
IIT Research Inst., Chicago, Ill.
DISPERSION-STRENGTHENED VANADIUM ALLOYS.
Final rept., 14 Dec 62-13 Dec 63
F. C. Holtz and L. B. Richard. 10 Jan 64, 34p
Contract N600(19)59567
Rept. no. B6007-6
OTS $1.00

DESCRIPTORS: *Vanadium alloys, *Niobium alloys, *Titanium alloys, *Zirconium alloys, *Hafnium alloys, *Dispersion hardening, Material forming, Creep, Additives, Carbon,

Vanadium-niobium base alloys containing additions of titanium, zirconium, or hafnium in combination with up to 0.2wt.-% carbon were prepared by arc-melting and fabricated to sheet for elevated temperature creep tests. Compositions based on V-60Nb and containing titanium or zirconium with carbon had good fabricability, but V-60Nb-1Hf-C and V-40Cb-30Ta-C alloys were difficult to work. Creep tests conducted on siliconized specimens in 2000 F air showed that large carbon additions (0.1 and 0.2wt.-%) produced increased creep rates in V-60Nb base alloys. The most creep resistant composition was V-60Nb-10Ta-1Zr-0.075C which exhibited 1.25% creep in 2.5 hours under a stress of 11, 200 psi. (Author)
(See also AD-418 081)

TID-16506
Illinois Univ., Urbana.
THE FORMATION OF POINT DEFECTS DURING PLASTIC DEFORMATION AND THEIR SUBSEQUENT ANNEALING BEHAVIOR
Howard K. Birnbaum. 30 Aug 62, 46p
Contract AT(11-1)1110
OTS $4.60

DESCRIPTORS: *Deformation, *Annealing, *Copper, *Plasticity

UCRL-7651
Lawrence Radiation Lab., Univ. of California, Livermore.
X-RAY MICROGRAPHY OF ALPHA PLUTONIUM
E. M. Cramer. 15 Jan 64, 15p
Contract W7405-eng-48
OTS $0.50

DESCRIPTORS: *Plutonium, Grain structures (Metallurgy)

LA-2989
Los Alamos Scientific Lab., N. Mex.
HOMOGENIZATION OF GALLIUM-STABILIZED DELTA-PHASE PLUTONIUM
Kaye Allan Johnson. Nov 63, 43p
Contract W7405-eng-36
OTS $1.00

DESCRIPTORS: *Plutonium, Metallography, Electron microscopy.

LADC-5851
Los Alamos Scientific Lab., N. Mex.
SPECIMEN PREPARATION FOR TRANSMISSION ELECTRON MICROSCOPY OF ALPHA URANIUM
Dana L. Douglass. [1962] 3p
Contract W7405-eng-36
CONF-105-1
OTS $1.10

DESCRIPTORS: *Uranium, *Foils

AEC Metallography Meeting, Los Alamos, N. Mex., May 1963

TID-19145
Massachusetts Inst. of Tech., Cambridge.
MICROSTRUCTURAL CHANGES DURING DEFORMATION OF [011] FIBER TEXTURED METALS
W. F. Hosford, Jr. [1962] 16p
Contract AT(30-1)906
OTS $1.60

DESCRIPTORS: *Metals, Aluminum, *Deformation, *Plasticity

MSAR-63-117
MSA Research Corp., Callery, Pa.
EFFECT OF 1200°F SODIUM ON AUSTENITIC AND FERRITIC STEELS. PHYSICAL PROPERTIES OF MATERIALS. Progress rept. no. 35
15 Aug 63, 23p
Contract AT(11-1)765
OTS $2.60

DESCRIPTORS:*Stainless steel, Austenite, *Sodium, *Corrosion.

NUCLEAR PHYSICS AND NUCLEAR CHEMISTRY

CONF-46-44
Atomic Energy of Canada, Ltd.
PRECISE KINETIC ENERGY MEASUREMENTS AND FINE STRUCTURE IN THE SPONTANEOUS FISSION OF Cf^{252}
J. S. Fraser, J. C. D. Milton, H. R. Bowman, and S. G. Thompson. [1962] 10p Prepared in cooperation with Lawrence Radiation Lab., Univ. of Calif., Berkeley.
Contract W7405-eng-48
OTS $1.10

DESCRIPTORS: *Californium, *Isotopes, *Fission products

American Physical Society Meeting, Washington, D.C., Apr 63

CONF-14-21
Atomics International, Canoga Park, Calif.
TRITIUM β-DECAY INDUCED REACTIONS IN THE POLYSTRENE FLUFF
John Y. Yang and Ronald B. Ingalls. [1963] 17p
Contract AT(11-1)GEN-8
OTS $1.60

DESCRIPTORS: *Styrene plastics, Tritium

American Chemical Society Meeting, Los Angeles, Calif., Mar-Apr 63

WAPD-T-1524
Bettis Atomic Power Lab., Pittsburgh, Pa.
EFFECT OF SOURCE ENERGY DEPENDENCE ON SPECTRUM HARDENING
W. W. Clendenin. Jul 62, 7p
Contract AT(11-1)GEN-14
OTS $1.10

DESCRIPTORS: *Neutron cross sections

WAPD-T-1377
Bettis Atomic Power Lab., Pittsburgh, Pa.
EPITHERMAL NEUTRON ABSORPTION IN SLAB LATTICES
M. Goldsmith. Jul 62, 17p
Contract AT(11-1)GEN-14
OTS $1.60

DESCRIPTORS: *Boron, *Neutron absorption, *Fast neutrons,

WAPD-T-1506
Bettis Atomic Power Lab., Pittsburgh, Pa.
MEASUREMENTS OF THE URANIUM METAL AND URANIUM OXIDE TEMPERATURE COEFFICIENT OF RESONANCE ABSORPTION
B. L. Palowitch and F. S. Frantz, Jr. Apr 62, 33p
Contract AT(11-1)GEN-14
OTS $3.60

DESCRIPTORS: *Uranium, *Isotopes, *Oxides, *Neutron absorption.

BNL-6207
Brookhaven National Lab., Upton, N. Y.
RECOIL ATOM REACTIONS AND ANNEALING PROCESSES IN COBALTIC HEXAMMINE BROMIDE
Kenji Yoshihara and Garman Harbottle. 27 Jul 62, 40p
Contract AT(30-2)GEN-16
OTS $3.60

CONF-39-46
Brookhaven National Lab., Upton, N. Y.
VELOCITY POLYNOMIALS IN NEUTRON THERMALIZATION
Charles S. Shapiro and Noel Corngold. Feb 63, 6p
Contract AT(30-2)GEN-16
OTS $1.10

DESCRIPTORS: *Neutrons, *Reactors

American Nuclear Society Meeting, Salt Lake City, Utah, Jun 63

NYO-7987
Carnegie Inst. of Tech., Pittsburgh, Pa.
RADIATION CHEMISTRY PROGRESS REPORT, APRIL 1, 1962-MARCH 31, 1963
Gilbert J. Mains. 31 Jan 63, 39p
Contract AT(30-1)2007
OTS $3.60

DESCRIPTORS: *Acetylenes, *Radiolysis, *Hydrogen, *Deuterium, Exchange reactions, *Ethanes, Photolysis

NYO-10423
Courant Inst. of Mathematical Sciences, New York Univ., N. Y.
ON THE USE OF DIATOMIC ORBITALS IN CALCULATIONS OF THE ELECTRONIC WAVE FUNCTIONS OF DIATOMIC MOLECULES
James W. Cooley. Sep 62, 32p
Contract AT(30-1)1480
N63-19083
OTS $3.60

DESCRIPTORS: *Molecules, *Quantum mechanics, *Atomic orbitals

EFINS-63-32
Enrico Fermi Inst. for Nuclear Studies, Univ. of Chicago, Ill.
THE OUTLOOK IN HYPERNUCLEAR PHYSICS
R. H. Dalitz. [1963] 19p
Contract AT(11-1)264
CONF-130-1
OTS $1.60

DESCRIPTORS: *Nuclear physics, *Hyperons

International Conference on Hyperfragments at St. Cergue, Apr 63

EFINS-63-39
Enrico Fermi Inst. for Nuclear Studies, Univ. of Chicago, Ill.
THE STRUCTURE OF THE WEAK INTERACTION $\Lambda + N \rightarrow N + N$
N. M. Block (Northwestern Univ.) and R. H. Dalitz. May 63, 11p
Contract AT(11-1)264
OTS $1.60

DESCRIPTORS: *Hyperons, *Nucleons, *V particles.

GA-3298
General Atomic Div., General Dynamics Corp., San Diego, Calif.
ASYMPTOTIC SOLUTIONS OF THE TRANSPORT EQUATION FOR THERMAL NEUTRONS
Mark Nelkin. 20 Jul 62, 22p
Contract AT(04-3)167
OTS $2.60

DESCRIPTORS: *Thermal neutrons, *Integral equations

TID-19085
Georgia Inst. of Tech., Atlanta Engineering Experiment Station.
RADIATION CHEMISTRY OF ORGANIC SYSTEMS.
Annual rept. no. 4, 1 Jan 31 Dec 62
James A. Knight, Jr. 28 Jan 63, 40p
Contract AT(40-1)2490
ORS $3.60

DESCRIPTORS: *Pentanes, *Radiolysis, *Heptanes, *Methyl radiclas.

HW-SA-2982
Hanford Atomic Products Operation, Richland, Wash.
SOLVENT EXTRACTION PROCESS FOR RECOVERY OF STRONTIUM, RARE EARTHS AND CESIUM FROM RADIOACTIVE WASTE SOLUTIONS
L. A. Bray. 17 Jun 63, 13p
Contract AT(45-1)1350
CONF-157-2
OTS $1.60

DESCRIPTORS: *Cesium, *Strontium, *Rare earths, *Solvent extraction, *Radioactive waste

American Chemical Society Northwest Regional Meeting, Bellingham, Wash., Jun 63

IS-475
Institute for Atomic Research, Iowa State Univ. of Science and Tech., Ames.
DISCUSSION OF QUADRUPOLE PRECESSION
J. C. Raich and R. H. Good, Jr. [1962] 24p
Contract W7405-eng-82
OTS $2.60

DESCRIPTORS: *Nuclear electric moments, *Electrostatic fields,

CONF-20-4
Institute for Atomic Research, Iowa State Univ. of Science and Tech., Ames.
POSITRON ANNIHILATION IN RARE EARTH METALS
A. R. Mackintosh and D. R. Gustafson. [1962] 6p
Contract AT(11-1)107
OTS $1.10

DESCRIPTORS: *Rare earths, Gadolinium, Cerium, Ytterbium, *Positrons, *Annihilation reactions

Third Rare Earth Conference, Clearwater, Fla., Apr 63

UCRL-11193
Lawrence Radiation Lab., Univ. of California, Berkeley.
ENERGY-MASS DISTRIBUTIONS AND ANGULAR MOMENTUM EFFECTS IN HEAVY-ION-INDUCED FISSION
Franz Plasil. Doctoral thesis. 31 Dec 63, 102p
Contract W7405-eng-48
OTS $2.50

DESCRIPTORS: *Fission.

UCRL-10210
Lawrence Radiation Lab., Univ. of California, Berkeley.
LIQUID SCINTILLATION COUNTING OF SOLUTIONS CONTAINING CAROTENOIDS AND CHLOROPHYLIS
Elie A. Shneous, Sam Aronoff, and Martha R. Kirk.
May 61, 15p
Contract W7405-eng-48
OTS $1.60

DESCRIPTORS: *Carotenoids, *Chlorophylis, *Counting methods, .Scintillation counters.

UCRL-11150
Lawrence Radiation Lab., Univ. of California, Berkeley.
A MEASUREMENT OF THE FORWARD DIFFERENTIAL CROSS SECTION FOR π^--p ELASTIC CHARGE-EXCHANGE SCATTERING AT 1.03 BeV/c USING THE 72-INCH HYDROGEN BUBBLE CHAMBER AS A NEUTRON DETECTOR
Alan Natapoff. Doctoral thesis. Dec 63, 120p
Contract W7405-eng-48
OTS $2.25

DESCRIPTORS: *Differential cross section, *Elastic scattering.

UCRL-11132
Lawrence Radiation Lab., Univ. of California, Berkeley.
PHYSICS DIVISION SEMIANNUAL REPORT, MAY-OCTOBER 1963. 22 Nov 63, 112p
Contract W7405-eng-48
OTS $2.25

DESCRIPTORS: *Nuclear physics.

UCRL-PUB-48
Lawrence Radiation Lab., Univ. of California, Berkeley.
STATUS REPORT, FISCAL YEAR 1963. 196p.
Prepared in cooperation with Lawrence Radiation Lab., Univ. of California.
Contract W7405-eng-48
OTS $2.75

DESCRIPTORS: *Scientific research.

UCRL-10336
Lawrence Radiation Lab., Univ. of California, Berkeley.
UNIVERSAL FERMI INTERACTION AND THE MEASUREMENT OF ELECTRIC CHARGE RENORMALIZATION
Malvin A. Ruderman. 28 Jun 62, 10p
Contract W7405-eng-48
OTS $1.10

DESCRIPTORS: *Neutrinos, *Electrons

UCRL-6994
Lawrence Radiation Lab., Univ. of California, Livermore.
ANGULAR CORRELATION ANALYSIS
D. H. White. 12 Jul 62, 17p
Contract W7405-eng-48
OTS $1.60

DESCRIPTORS: *Scattering, Statistical analysis.

UCRL-6926
Lawrence Radiation Lab., Univ. of California, Livermore.
THE FISSION CROSS SECTION OF U^{235}
C. D. Bowman, G. F. Auchampaugh, and S. C. Fultz.
15 Jun 62, 35p
Contract W7405-eng-48
OTS $3.60

DESCRIPTORS: *Uranium, *Isotopes, *Neutron cross sections

UCRL-6967
Lawrence Radiation Lab., Univ. of California, Livermore.
THE FORMATION OF PROTONS FROM WATER BY ELECTRON IMPACT
F. S. Baker, G. O. Brink. 26 Jul 62, 8p
Contract W7405-eng-48
OTS $1.10

DESCRIPTORS: *Protons, *Electron beams, *Water

UCRL-7616
Lawrence Radiation Lab., Univ. of California, Livermore.
METHOD AND APPARATUS FOR QUANTITATIVE NEUTRON ACTIVATION ANALYSIS OF LARGE SAMPLES
William H. Hutchin. 8 Jan 64, 6p
Contract W7405-eng-48
OTS $0.50

DESCRIPTORS: Quantitative analysis, *Radioactivation analysis

UCRL-6990-T
Lawrence Radiation Lab., Univ. of California, Livermore.
TRANSPORT OPERATOR THEORY OF MULTIPLE SCATTERING
J. R. Terrall. Jul 62, 91p
Contract W7405-eng-48
OTS $8.60

DESCRIPTORS: *Scattering, *Integral equations.

NASA-TN-D-2122
Lewis Research Center, National Aeronautics and Space Administration, Cleveland, Ohio
A MONTE CARLO CACLUATION OF THE NUCLEAR COLLISION DENSITY OF PRIMARY GALACTIC PROTONS IN A SLAB OF ALUMINUM
Millard L. Wohl. Mar 64, 18p
N64-17295
OTS $0.50

DESCRIPTORS: *Proton scattering, Aluminum, Sheets, *Secondary emission, Density, Mathematical analysis, *Monte Carlo method, Programming (Computers) Neutron transport theory

LA-2235
Los Alamos Scientific Lab., N. Mex.
A MEASUREMENT OF THE Li^7 (n, n' α)T CROSS SECTION FOR SEVERAL NEUTRON ENERGIES FROM 4 TO 15 Mev BY ABSOLUTE COUNTING TECHNQUES
Marvin E. Wyman and Munson M. Thorpe. Jun 58, 20p
Contract W7405-eng-36
OTS $1.60

DESCRIPTORS: *Lithium, *Isotopes, *Neutron reactions, *Fast neutrons

PB-165 297
Material Lab., New York Naval Shipyard, Brooklyn, N. Y.
THERMAL RADIATION MEASUREMENTS USING PASSIVE INDICATORS. Rept. for Apr-Jun 52, on Operation Tumbler-Snapper, Nevada Proving Grounds
L. Banet, P. Grinoch, A. Hirschman, and T. I. Monahan. Feb 53, declassified 13 Jun 62, 15p
Rept. no. WT-544
OTS $1.60

DESCRIPTORS: *Thermal radiation, *Nuclear explosions, *Radiation pyrometers, Temperature sensitive elements.

The use of a passive-type instrument to measure the radiant exposure at a distance from a nuclear detonation was investigated. The basic principle of the instrument involves the dependence of thermal damage on the orientation of a heat-sensitive material's surface with respect to the incident radiation. In this instrument the sensitive material is mounted on the round surface of a semicircular wood disc. At a given distance, the incident energy on the surface exceeds the radiant exposure required to produce characteristic damage on the material for all angles up to the threshold angle. The energy incident on the normal surface is the energy required to produce the damage divided by the cosine of the threshold angle. In the instrument evaluated, the sensitive materials employed were black carbon paper and black matte paper, with special paint striped to form windows and prevent the propagation of flame from one window to an adjoining window. The results of the experiment indicate that the response of the matte paper was in agreement with the radiant exposure values determined with calorimeters, while the black carbon paper gave approximately one-half the calorimeter value. (Author)

TID-16522
Michigan Univ., Ann Arbor.
THERMAL NEUTRON ACTIVATION ANALYSIS OF TITANIUM USING 5.8-MINUTE TITANIUM-51 AND RAPID RADIOCHEMICAL SEPARATIONS
Chong Kuk Kim and W. Wayne Meinke. [1961] 18p
Contract AT(11-1)1149
OTS $1.60

DESCRIPTORS: *Titanium, *Radioactivation analysis.

PB-165 296
Naval Radiological Defense Lab., San Francisco, Calif.
THERMAL RADIATION FROM A NUCLEAR DETONATION. Rept. for Apr-Jun 52, on Operation Tumbler-Snapper, Nevada Proving Grounds
A. Broido, C. P. Butler, R. P. Day, R. W. Hillendahl, and S. B. Martin. Mar 53, declassified 14 Jun 62, 101p.
Rept. no. WT-543
OTS $9.10

DESCRIPTORS: *Thermal radiation, *Nuclear explosions, Calorimeters, Radiometers,

Measurements of thermal radiation from four nuclear detonations at Operation TUMBLER-SNAPPER are described. In addition to measurements of the total thermal energy received as a function of distance, elevation, and field of view of the measuring device, measurements were made of the thermal pulse shape, the spectral distribution, and the energy reflected from the ground. The results show the relationship between weapon yield and such factors as total thermal energy at any distance, maximum intensity and duration of the thermal pulse, thermal efficiency of the weapons (ratio of thermal yield to total yield as determined by radiochemical analysis), and the amount of local obscuration caused by the thermal radiation and blast wave. The data indicate a decrease in thermal efficiency with increasing weapon yield, ranging from about 44 per cent at 1 KT to about 34 per cent at 30 KT. The time to the second maximum of the thermal pulse ranges from approximately 100 msec for a 1 KT weapon to about 200 msec for a 30 KT detonation. (Author)

CONF-128-1
North Carolina Univ., Chapel Hill.
ENERGY LEVELS IN A SQUARE WELL WITH HARD CORE
R. L. Hoover, E. Merzbacher, and J. E. Rives. [1962] 9p Prepared in cooperation with Duke Univ.
Contract AT(40-1)2408
OTS $1.10

DESCRIPTORS: *Nuclei, *Quantum mechanics.

American Physical Society Meeting, Florida State Univ., Tallahasee, Apr 63

ORNL-TM-595
Oak Ridge National Lab., Tenn.
SHIELDING CALCULATIONS, POT CALCINATION DEMONSTRATION AT HANFORD
J. M. Holmes, H. Pfohl, and E. D. Arnold. 21 Jun 63 15p
Contract W7405-eng-26
OTS $1.60

DESCRIPTORS: *Shielding.

ORNL-TM-464
Oak Ridge National Lab., Tenn.
URANIUM-THORIUM SEPARATION BY DI-SEC-BUTYLPHENYL-PHOSPHONATE EXTRACTION
A. T. Gresky and R. G. Mansfield. 31 Jan 63, 4p
Contract W7405-eng-26
OTS $1.10

DESCRIPTORS: *Uranium, Separation, *Thorium, *Solvent extraction

IDO-14613
Phillips Petroleum Co., Idaho Falls.
MANUAL OF RADIOCHEMICAL METHODS
D. G. Olson, ed. 3 Jan 64, 84p
Contract AT(10-1)205
OTS $2.00

DESCRIPTORS: *Radiochemistry, *Instruction manuals.

RAI-104
Radiation Applications Inc., Long Island City, N. Y.
THE REMOVAL OF METALLIC IONS BY FOAMING AGENTS AND SUSPENSIONS: LABORATORY AND ENGINEERING STUDIES. Annual rept. 1 Jul 61-30 Jun 62.
Eliezer Rubin, Ernest Schonfeld, and Richard Everett, Jr. 4 Oct 62, 106p
Contract W7405-eng-26
OTS $10.10

DESCRIPTORS: *Strontium, *Cesium, *Calcium, *Magnesium, Separation.

CONF-11-5
Rensselaer Polytechnic Inst., Troy, N. Y.
WATER SPECTRA AND ENERGY EXCHANGE KERNELS
P. B. Daitch and M. J. Ohanian. 31 Jul 63, 12p
Contract AT(30-3)328
OTS $1.60

DESCRIPTORS: *Water, *Neutron spectrum

American Nuclear Society Winter Meeting, Washington, D. C. Nov 63

NYO-10273
Rochester Univ., N. Y.
ON THE MODULATION OF COSMIC RAY NUCLEI WITH $Z > 2$ DURING THEIR PROPAGATION
M. V. Krishna Appa Rao. 27 Jun 63, 14p
Contract AT(30-1)875
OTS $1.60

DESCRIPTORS: *Cosmic rays

NYO-10238
Rochester Univ., N. Y.
SOME CONSEQUENCES OF ANALYTICITY AND UNITARITY CONDITIONS IN SCATTERING PROBLEMS (II)
Susumu Okubo. 5 Jul 62, 15p
Contract AT(30-1)875
OTS $1.60

DESCRIPTORS: *Scattering, *Nucleons, *Mesons, *Pions

SC-RR-64-70
Sandia Lab., Albuquerque, N. Mex.
FALLOUT REPORT: BETA-GAMMA RADIOACTIVITY IN AIR AT SANDIA LABORATORY, JULY-DECEMBER 1963
R. E. Womelsduff, Mar 64, 12p
OTS $0.50

DESCRIPTORS: *Radioactive fallout, Beta particles, Gamma rays.

CONF-46-78
Virginia Polytechnic Inst., Blacksburg.
POLARIZATION OF NEUTRONS FROM THE $D(d,n)He^3$ REACTION
J. T. Rogers and C. D. Bond. [1962] 13p
Contract AT(40-1)2726
OTS $1.60

American Physical Society Meeting, Washington, D. C., Apr 63

CONF-13-7
William Marsh Rice Univ., Houston, Tex.
DISINTEGRATION OF O^{16} AND C^{12} BY FAST NEUTRONS
E. A. Davis, T. W. Bonner, D. W. Worley, Jr., and R. Bass. [1963] 17p
Contract AT(40-1)1316
TID-19046
OTS $1.60

DESCRIPTORS: *Carbon, *Oxygen, *Isotopes, *Neutron reactions, *Fast neutrons.

American Physical Society 1963 Southwestern Meeting, Houston, Tex., Feb 63

TID-16463
Wisconsin Univ., Madison.
POLARIZATION OF PROTONS FROM THE $He^3(d,p)He^4$ REACTION
R. I. Brown and W. Haeberli. [1962] 37p
Contract AT(11-1)GEN-7
OTS $3.60

DESCRIPTORS: *Helium, *Isotopes, Deuteron reactions, *Deuterons, *Protons, Polarization,

Elementary Particles

BNL-7105
Brookhaven National Lab., Upton, N. Y.
PRELIMINARY STUDY OF RESONANCE PRODUCTION IN THE $\Xi K \pi$ FINAL STATE
P. L. Connolly, E. L. Hart, K. W. Lai, M. Goldberg, and M. Gundzik (Syracuse Univ.) [1963] 15p
Contract AT(30-2)GEN-16
BNL-A-76
OTS $1.60

DESCRIPTORS: *Mesons, *Protons, *Hyperons

TID-19072
Columbia Univ., New York.
THE KHURI-TREIMAN REPRESENTATION AND PERTURBATION THEORY
John B. Bronzan (Palmer Physical Lab., Princeton Univ.) and Claude Kacser. [1963] 36p
Contract AT(30-1)1934
OTS $3.60

DESCRIPTORS: *Perturbation theory, *Elementary particles.

NYO-10431
Courant Inst. of Mathematical Sciences, New York Univ., N. Y.
A METHOD OF CALCULATING GROUND-STATE PROPERTIES OF MANY PARTICLE SYSTEMS USING REDUCED DENSITY MATRICES
Claude Garrod and Jerome K. Percus. 15 Jul 63, 46p
Contract AT(30-1)1480
OTS $4.60

DESCRIPTORS: *Elementary particles, *Quantum mechanics, Mathematics

EFINS-62-5(Rev.)
Enrico Fermi Inst. for Nuclear Studies, Univ. of Chicago, Ill.
LOW-ENERGY PION-KAON INTERACTIONS
Richard C. Arnold. May 62, 27p
Contract AT(11-1)264
OTS $2.60

DESCRIPTORS: *Mesons, *Pions

EFINS-62-17
Enrico Fermi Inst. for Nuclear Studies, Univ. of Chicago, Ill.
REGGE POLES IN RELATIVISTIC SCHRODINGER THEORY
Reinhard Oehme. 3 Mar 63, 20p
Contract AT(11-1)264
OTS $1.60

DESCRIPTORS: *Elementary particles, Scattering

EFINS-63-29
Enrico Fermi Inst. for Nuclear Studies, Univ. of Chicago, Ill.
THE STRONG AND WEAK INTERACTIONS OF BOUND Λ-PARTICLES
R. H. Dalitz. [1963] 34p
Contract AT(11-1)264
CONF-130-2
OTS $3.60

DESCRIPTORS: *Hyperons, *V particles

International Conference on Hyperfragments at St. Cergue, Apr 63

PUC-1962-78
Palmer Physical Lab., Princeton Univ., N. J.
SCATTERING OF HIGH ENERGY DEUTERONS BY COMPLEX NUCLEI
Larry Zamick. Doctoral thesis. 6 Jul 62, 44p
Contract AT(30-1)937
OTS $4.60

DESCRIPTORS: *Deuterons, Scattering, Carbon, Nuclei,

CONF-46-80
Pennsylvania State Univ., University Park.
NEUTRAL SCALAR THEORY WITH RECOIL
V. Barger and E. Kazes. [1963] 25p
Contract AT(30-1)2133
OTS $2.60

DESCRIPTORS: *Mesons, *Nucleons

American Physical Society Meeting, Washington, D. C., Apr 63

NYO-10239
Rochester Univ., N. Y.
REGGE'S TRAJECTORY AND DOMAIN OF HOLOMORPHY
Susumu Okubo. 16 Jul 62, 25p
Contract AT(30-1)875
OTS $2.60

DESCRIPTORS: *Elementary particles, Scattering,

Instruments and Installations

TID-16186
Argonne National Lab., Ill.
CIRCUITRY FOR A HIGH ALTITUDE GAMMA SPECTROMETRY SYSTEM
Richard B. Keener. May 62, 6p
Contract W31-109-eng-38
UAC-6441
OTS $1.10

DESCRIPTORS: Circuits, *Nuclear radiation spectrometers, Airborne

HW-73891(Rev.)
Hanford Atomic Products Operation, Richland, Wash.
A METHOD FOR IMMEDIATE DETECTION OF HIGH LEVEL NEUTRON EXPOSURE BY MEASUREMENT OF SODIUM-24 IN HUMANS
R. H. Wilson. 31 Jul 62, 11p
Contract AT(45-1)1350
OTS $1.60

DESCRIPTORS: *Neutrons, Man, *Disasters.

LADC-5359
Los Alamos Scientific Lab., N. Mex.
NEUTRON DOSE ESTIMATES IN THE SL-1 ACCIDENT
D. F. Petersen. [22 Aug 62] 9p
Contract W7405-eng-36
OTS $1.10

DESCRIPTORS: *Fast neutrons, *Phosphorus, *Isotopes Hair, *Reactor accidents.

CONF-125-3
Midwestern Universities Research Association, Madison, Wis.
DESIGN OF PROTON LINEAR ACCELERATORS FOR ENERGIES UP TO 300 Mev
D. E. Young, R. S. Christian, T. W. Edwards, F. E. Mills, and J. Van Bladel. [Apr 63] 12p
Contract AT(11-1)384
OTS $1.60

DESCRIPTORS: *Linear accelerators, *Proton accelerators

Sector-Focused Cyclotron and Meson Factory Conference at CERN, Geneva, Switzerland, Apr 63

CONF-125-5
Midwestern Universities Research Association, Madison, Wis.
SPIRAL SECTOR FFAG MAGNET DESIGN AND FIELD MEASUREMENT.
S. C. Snowdon, R. S. Christian, G. del Castillo, and R. W. Fast. Apr 63, 5p
Contract AT(11-1)384
OTS $1.10

DESCRIPTORS: *Magnets.

Sector-Focused Cyclotron and Meson Factory Conference at CERN, Geneva, Switzerland, Apr 63

CONF-125-4
Midwestern Universities Research Association, Madison, Wis.
USE OF A 10 GeV HIGH INTENSITY ACCELERATOR AS A PION FACTORY
F. T. Cole and A. Galonsky. [Apr 63] 3p
Contract AT(11-1)384
OTS $1.10

DESCRIPTORS: *Mesons, *Pions, *Proton accelerators.

Sector-Focused Cyclotron and Meson Factory Conference at CERN, Geneva, Switzerland, Apr 63

TID-19111
New York Univ., N. Y.
THE MEASUREMENT OF ENVIRONMENTAL RADIATION. Annual rept.
15 Jun 63, 82p
Contract AT(30-1)1704
OTS $8.60

DESCRIPTORS: *Cosmic rays, *Radiation measurement systems, Ionization chambers.

ORNL-TM-643
Oak Ridge National Lab., Tenn.
OAK RIDGE ISOCHRONOUS CYCLOTRON INFORMATION GUIDE FOR USERS
Jul 63, 12p
Contract W7405-eng-26
OTS $1.60

DESCRIPTORS: *Handbooks, *Cyclotrons.

CONF-58-4
Pegram Nuclear Physics Labs., Columbia Univ., N. Y.
A LINEAR AMPLIFIER SUITABLE FOR HIGH COUNTING RATES
J. Hahn and V. Guiragossian. [1963] 22p
OTS $2.60

DESCRIPTORS: *Amplifiers, *Radiation measurement system components.

IEEE International Convention, New York, Mar 63

PPAD-461E
Princeton-Pennsylvania Accelerator, Princeton Univ., N. J.
SPARK CHAMBERS WITH FERRITE CORE MEMORIES
J. R. Waters. 17 Jul 62, 11p
Contract AT(30-1)2137
OTS $1.60

DESCRIPTORS: *Memory devices

TID-19297
Sloan-Kettering Inst. for Cancer Research, New York.
THE DIRECT MEASUREMENT OF LOCAL ABSORBED DOSE PRODUCED BY RADIATION BEAMS IN TISSUE MATERIALS: Annual progress rept. for 1 Jul 62-30 Jun 63
John S. Laughlin. 18 Jul 63, 9p
Contract AT(30-1)1451
OTS $1.10

DESCRIPTORS: *Calorimeters, *Ionization chambers.

TID-19047
William Marsh Rice Univ., Houston, Tex.
THE DISINTEGRATION OF SILICON BY FAST NEUTRONS
B. Mainsbridge, T. W. Bonner, and T. A. Rabson. [1962] 23p
Contract AT(40-1)1316
CONF-13-6
OTS $2.60

DESCRIPTORS: *Neutron reactions, *Silicon, *Isotopes, *Detectors, *Fast neutrons.

American Physical Society 1963 Southwestern Meeting, Houston, Tex., Feb 63

TID-19112
Wisconsin Univ., Madison.
X-RAY BEAM QUALITY MEASUREMENTS UTILIZING TL DOSIMETERS
Gordon N. Kenney and John R. Cameron. [1963] 26p
Contract AT(11-1)1105
OTS $2.60

DESCRIPTORS: *X-rays, Lithium, Fluorides, Aluminum, Oxides, Radiation effects, *Dosimeters

Nuclear Engineering and Power

IDO-28584(Add. 1)
Aerojet-General Nucleonics, San Ramon, Calif.
ARMY GAS-COOLED REACTOR SYSTEMS PROGRAM. STUDY OF MOBILE GAS-COOLED NUCLEAR POWER PLANTS Jun 63, 42p
Contract AT(10-1)880
OTS $4.60

DESCRIPTORS: *Gas-cooled reactors

TID-17368
American Bosch Arma Corp., Springfield, Mass.
HYDRAULIC CONTROL ROD DRIVE MECHANISM PROTOTYPE PROGRAM. Quarterly rept. no. 4 for period ending 31 Oct 62.
R. B. Hussey. 20 Nov 62, 22p
Contract AT(30-1)2932
OTS $2.60

DESCRIPTORS: *Control rods, *Reactor system components

CONF-39-33
Atomic Energy Commission, Washington, D. C. Div. of Reactor Development.
REPORT OF THE OBJECTIVES AND PLANS FOR THE AEC'S CIVILIAN POWER GAS COOLED REACTOR PROGRAM
Robert E. Pahler. Jun 63, 16p
OTS $1.60

DESCRIPTORS: *Gas-cooled reactors, *Power reactors

American Nuclear Society Meeting, Salt Lake City, Utah, Jun 63

NAA-SR-8702
Atomics International, Canoga Park, Calif.
COMPATIBILITY OF BORON CARBIDE WITH POTENTIAL AOMR CONTROL ROD CLADDING MATERIALS
R. D. Hahn. 1 Mar 64, 24p
Contract AT(11-1)GEN-8
OTS $0.50

DESCRIPTORS: *Reactor materials, Boron compounds, Carbides.

NAA-SR-8610
Atomics International, Canoga Park, Calif.
FLOW STABILITY TEST LOOP
W. H. Wickes, E. E. Stoner, and F. J. Halfen.
1 Mar 64, 39p
Contract AT(11-1)GEN-8
OTS $1.00

NAA-SR-MEMO-7789
Atomics International, Canoga Park, Calif.
FOUR GROUP CROSS SECTIONS
B. W. Colston. 11 Oct 62, 16p
Contract AT(11-1)GEN-8
OTS $1.60

DESCRIPTORS: *Neutron cross sections.

NAA-SR-7938
Atomics International, Canoga Park, Calif.
A REACTOR TRANSIENT HEAT TRANSFER MODEL
D. G. Mason and R. W. Winson. 1 Mar 64, 20p
Contract AT(11-1)GEN-8
OTS $0.50

WAPD-T-1570
Bettis Atomic Power Lab., Pittsburgh, Pa.
ANOMALOUS EMBRITTLING EFFECTS OBSERVED DURING IRRADIATION STUDIES ON PRESSURE VESSEL STEELS
G. F. Carpenter, N. R. Knopf, and E. S. Byron. [1962] 70p
Contracts AT(11-1)GEN-14 and NObs-78844
CONF-39-94
OTS $6.60

DESCRIPTORS: *Pressure vessels, *Steel, *Radiation effects.

American Nuclear Society Ninth Annual Meeting, Salt Lake City, Jun 63

EURAEC-612
Centro Informazioni Studi Esperienze, Milan (Italy)
AN ADVANCED RESEARCH PROGRAM ON THE APPLICATION OF STEAM-WATER SPRAY TO THE COOLING OF LIGHT WATER REACTORS. CAN-2. Quarterly progress rept. no. 7, 1 Jan-31 Mar 63, Apr 63, 16p
Contract 060-61-7-RDI
CISE-R-76
OTS $1.60

DESCRIPTORS: *Reactor coolants, Reactor fuel elements, Fluid flow, *Heat transfer, *Light water reactors

TID-14146
Curtiss-Wright Corp., Quehanna, Pa.
FABRICATION, IRRADIATION, AND IRRADIATION DAMAGE STUDIES OF A HIGH TEMPERATURE FUEL ELEMENT MATERIAL. Final rept. for 9 Mar-30 Jun 61
C. A. Baumgartner and W. B. Shearer. 18 Sep 61, 58p
Contract AT(33-3)18
WNQ-61-10-1
OTS $5.60

DESCRIPTORS: Reactor fuel elements, *Reactor materials, Radiation damage.

RFP-63
Dow Chemical Co., Denver, Colo.
CRITICALITY MEASUREMENTS ON PLUTONIUM METAL PRELIMINARY TO THE DESIGN OF A MELTING CRUCIBLE
C. L. Schuske, M. G. Arthur, and D. F. Smith.
1 Jun 56, declassified 29 Jan 63. 13p
Contract AT(29-1)1106
OTS $1.60

DESCRIPTORS: *Plutonium, *Crucibles

RFP-325
Dow Chemical Co., Golden, Colo.
TWO EXPERIMENTAL SUB CRITICAL ARRAYS OF $Pu(NO_3)_4$ SOLUTION
C. L. Schuske. [Jul 63] 7p
Contract AT(29-1)1106
OTS $1.10

DESCRIPTORS: *Plutonium, *Nitrates

EURAEC-702
FIAT, Turin (Italy)
A NEW APPROACH ON ENGINEERING HOT CHANNEL AND HOT SPOT STATISTICAL ANALYSIS
U. L. Businaro and G. P. Pozzi. May 63, 76p
Contract 035-60-11-RDI
FN-E-35
OTS $7.60

DESCRIPTORS: *Programming (Computers), Statistical analysis, Heat transfer

CONF-39-48
General Electric Co., Cincinnati, Ohio
THE 630A CRITICAL EXPERIMENT: DESCRIPTION AND EXPERIMENTAL RESULTS
G. D. Pincock and R. E. Wood. 7 Jun 63, 18p
Contract AT(11-1)171
TM-63-6-700
OTS $1.60

DESCRIPTORS: *Critical assemblies

American Nuclear Society Meeting, Salt Lake City, Utah, Jun 63

GEAP-4277
General Electric Co., San Jose, Calif.
EVESR-NUCLEAR SUPERHEAT FUEL DEVELOPMENT PROJECT. Quarterly rept. no. 4, Mar-May 63.
Jun 63, 59p
Contract AT(04-3)189
OTS $5.60

DESCRIPTORS: *Reactor fuels

CONF-39-45
General Electric Co., San Jose, Calif.
EXPERIMENTAL STUDIES OF TRANSIENT EFFECTS IN FAST CERAMIC REACTOR (FCR) FUELS
J. H. Field and M. J. McNelly. [1963] 16p
Contract AT(04-3)189
OTS $1.60

DESCRIPTORS: *Fast reactors, *Reactor fuel elements, *Reactor fuels.

American Nuclear Society Meeting, Salt Lake City, Utah, Jun 63

GEAP-4155
General Electric Co., San Jose, Calif.
HIGH POWER DENSITY DEVELOPMENT PROJECT. Quarterly progress rept. no. 11, Oct-Dec 62.
R. L. Holladay, comp. 1 Jan 63, 71p
Contract AT(04-3)361
OTS $7.60

DESCRIPTORS: *Reactor fuel elements, *Reactor fuel rods, *Stainless steel, Programming (Computers), Power reactors

CONF-39-64
General Electric Co., San Jose, Calif.
RESIDUAL AND FISSION GAS RELEASE FROM URANIUM DIOXIDE
C. N. Spalaris and F. H. Megerth. 31 May 63, 50p
Contract AT(04-3)189
OTS $4.60

DESCRIPTORS: *Uranium, *Oxides, *Fission products.

American Nuclear Society Ninth Annual Meeting, Salt Lake City, Jun 63

GNEC-210(Suppl. 3)
General Nuclear Engineering Corp., Dunedin, Fla.
DESIGN AND FABRICATION OF THE BONUS REACTOR PRESSURE VESSEL. SUPPLEMENT 3
J. F. Gibbons and A. S. Jameson, comp. 31 Jul 63, 63p
Contract AT(40-1)2674
OTS $6.60

DESCRIPTORS: *Power reactors, *Pressure vessels

HW-74955
Hanford Atomic Products Operation, Richland, Wash.
EFFECTS OF COLD WORK AND NEUTRON IRRADIATION ON THE TENSILE PROPERTIES OF ZIRCALOY-2
A. L. Bement, Jr. Apr 63, 194p
Contract AT(45-1)1350
OTS $13.50

DESCRIPTORS: *Tensile properties

TID-16485
Knolls Atomic Power Lab., Schenectady, N. Y.
ANALYSIS FOR DIFFUSION THEORY FLUX·PEAKING AT A SHARP CORNER
J. H. Smith. 22 Jun 62, 17p
Contract W31-109-eng-52
OTS $1.60

DESCRIPTORS: *Neutrons, Reactors, *Neutron flux, Neutron transport theory.

CONF-133-1
Knolls Atomic Power Lab., Schenectady, N. Y.
COMPARISON OF KAPL CLEAN CRITICAL AND SUBCRITICAL EXPERIMENTS WITH CALCULATIONS
D. R. Bach, S. I. Bunch, J. A. Bistline, R. J. Cerbone, and F. Feiner. [1962] 75p
Contract W31-109-eng-52
OTS $7.60

DESCRIPTORS: *Critical assemblies, *Subcritical assemblies

IAEA Symposium of Exponential and Critical Experiments with Calculations, Amsterdam, Sep 63

N64-16756
Laboratory for Fluid Flow and Heat Transport Phenomena, Univ. of Michigan, Ann Arbor.
CAVITATION DAMAGE AND PERFORMANCE RESEARCH FACILITIES. Technical rept. no. 12
Frederick G. Hammitt. 1 Oct 63, 38p
Contract NASw-6550; Grants NsG-39-60 and NSF G-22529
Rept. no. 03424-12-T; NASA CR-53119
OTS $3.60

DESCRIPTORS: *Cavitation, Damage, Nuclear engineering, Laboratory equipment, *Venturi tubes, *Test facilities.

N64-16763
Laboratory for Fluid Flow and Heat Transport Phenomena, Univ. of Michigan, Ann Arbor.
CAVITATION DAMAGE MEASUREMENTS IN MERCURY BY RADIOTRACER ANALYSIS. Technical rept. no. 10
Willy Smith, Juan M. Nieto, and Frederick G. Hammitt. Oct 63, 78p
Grant NsG-39-60
Rept. 03424-10-T; NASA CR-53112
OTS $7.60

DESCRIPTORS: *Steel, *Stainless steel, Radiation damage, *Cavitation, Damage, Liquid metals, *Mercury, *Tracer studies.

N64-16764
Laboratory for Fluid Flow and Heat Transport Phenomena, Univ. of Michigan, Ann Arbor.
DETERMINATION OF CAVITATION CONDITIONS FROM DENSITY PROFILES OF MERCURY IN A VENTURI. Technical rept. no. 11
Ian E. B. Lauchlan, Frederick G. Hammitt, Richard D. Ivany, M. John Robinson, and Willy Smith. Oct 63, 45p
Grant NsG-39-60
Rept. 03424-11-T; NASA CR-53113
OTS $4.60

DESCRIPTORS: *Cavitation, Damage, *Liquid metals, *Mercury, *Venturi tubes, Densimeters, Gamma rays.

LAMS-2963
Los Alamos Scientific Lab., N. Mex.
DOSE RATES, ACTIVITY, AND SHIELDING TRANSMISSION FACTORS FOR U^{235} FISSION PRODUCTS AFTER SHORT IRRADIATION
Donald A. McKown. 18 Jul 63, 24p
Contract W7405-eng-36
OTS $0.50

LAMS-3012
Los Alamos Scientific Lab., N. Mex.
EXPERIMENTAL STUDIES RELATING TO ROTATING FLUIDIZED BED REACTORS
H. P. Deinken, A. C. Juveland, and J. E. Dougherty. Sep 63, 38p
Contract W7405-eng-36
OTS $1.00

LADC-5383
Los Alamos Scientific Lab., N. Mex.
PROBABILITY DISTRIBUTION OF NEUTRONS AND PRECURSORS IN A MULTIPLYING ASSEMBLY
George I. Bell. [21 Aug 62] 81p
Contract W7405-eng-36
OTS $8.10

DESCRIPTORS: *Neutrons, *Critical assemblies,

MITNE-35
Massachusetts Inst. of Tech., Cambridge.
HEAVY WATER, NATURAL URANIUM LATTICE RESEARCH. Summary rept.
I. Kaplan, D. D. Lanning, A. E. Profio, and T. J. Thompson. 9 Jul 63, 63p
Contract AT(30-1)2344
NYO-10209
OTS $6.60

DESCRIPTORS: *Heavy water reactors, *Reactor fuel rods, Reactor lattice parameters

NMI-7009
Nuclear Metals, Inc., Concord, Mass.
A METALLOGRAPHIC STUDY OF GAS BEHAVIOR IN URANIUM IRRADIATED WITH ALPHA PARTICLES
H. M. Green. 28 Sep 62, 57p
Contract AT(50-1)1565
OTS $5.60

DESCRIPTORS: *Uranium, *Uranium alloys, *Radiation effects, Helium, Bubbles, *Metallography

CONF-39-59
Oak Ridge National Lab., Tenn.
RELEASE OF FISSION PRODUCTS DURING IN-PILE MELTING OF UO_2
W. E. Browning, Jr., C. E. Miller, Jr., R. P. Shields, and B. F. Roberts. [1963] 37p
Contract W7405-eng-26
OTS $3.60

DESCRIPTORS: *Fission products, *Uranium, *Oxides

American Nuclear Society Ninth Annual Meeting, Salt Lake City, Jun 63

ORNL-TM-483
Oak Ridge National Lab., Tenn.
STRUCTURAL ANALYSIS OF ZIRCALOY FUEL-ELEMENT CONTAINERS FOR THE NS SAVANNAH REACTOR
L. R. Shobe. 19 Aug 63, 149p
Contract W7405-eng-26
OTS $11.00

DESCRIPTORS: Reactor fuel elements, *Stresses, Mathematical analysis.

CONF-39-44
Oak Ridge National Lab., Tenn.
USE OF REACTOR GAMMA RADIATION AS A REACTOR CONTROL AND SAFETY PARAMETER
D. P. Roux and S. H. Hanauer. [1962] 5p
Contract W7405-eng-26
OTS $1.10

DESCRIPTORS: *Reactor safety systems, *Reactor control, *Gamma rays, Ionization chambers.

American Nuclear Society Meeting, Salt Lake City, Utah, Jun 63

IDO-16932
Phillips Petroleum Co., Idaho Falls.
MATERIALS TESTING REACTOR-ENGINEERING TEST REACTOR TECHNICAL BRANCHES QUARTERLY REPORT, JULY 1-SEPTEMBER 30, 1963. 15 Feb 64, 64p
Contract AT(10-1)205
OTS $1.50

CONF-39-52
Pratt and Whitney Aircraft Div., United Aircraft Corp., Middletown, Conn.
SNAP-50/SPUR REACTOR DEVELOPMENT
Frank D. Haines. [1963] 5p
Contract AT(11-1)229
OTS $1.10

American Nuclear Society Meeting, Salt Lake City, Utah, Jun 63

SC-DR-316-63
Sandia Corp., Albuquerque, N. Mex.
PRELIMINARY EVALUATION OF EARTH TARGETS FOR USE IN IMPACT EFFECTS STUDIES
John L. Colp and Louis Jean Thompson. Mar 64, 65p
Contract AT(29-1)789
OTS $1.50

TID-16476
Savannah River Lab., Aiken, S. C.
CONTROL OF HYDRIDE ORIENTATION IN ZIRCALOY
M. R. Louthan, Jr. and R. P. Marshall. 29 Aug 62, 29p
Contract AT(07-2)1
OTS $2.60

DESCRIPTORS: *Hydrogen, Chemical properties, *Reactor fuel cladding

SWRI-5-1348-7-1
Southwest Research Inst., San Antonio, Tex.
EVALUATION OF THE SERVICEABILITY OF THE ELK RIVER REACTOR PRESSURE VESSEL. Progress rept. no. 1, 1 Jun-31 Jul 63
David W. McDowell, Jr., Jose McDonald, Jr., and William E. Oakey. 30 Aug 63, 47p
Contract AT(11-1)1228
OTS $4.60

DESCRIPTORS: *Fatigue (Mechanics), *Steel, Radiation effects, *Welds, *Pressure vessels.

UNC-5061
United Nuclear Corp., White Plains, N. Y.
LOW TEMPERATURE SINTERING OF UO_2: IRRADIATION TESTING. Final rept.
N. Fuhrman and R. B. Holden. 30 Aug 63, 27p
Contract AT(30-1)2374
OTS $2.60

GEAP-4278
Vallecitos Atomic Lab., General Electric Co., San Jose, Calif.
ACCURATE NUCLEAR FUEL BURNUP ANALYSES. Quarterly progress rept. no. 6, Mar-May 63
B. F. Rider, C. P. Ruiz, J. P. Peterson, Jr., and P. S. Luke, Jr. 1 Jun 63, 29p
Contract AT(04-3)189
OTS $2.60

DESCRIPTORS: *Reactor fuels, Consumption, *Fission products

WCAP-3711
Westinghouse Electric Corp., Pittsburgh, Pa.
THE HETEROGENEOUS REPRESENTATION OF CONTROL RODS IN LIGHT WATER LATTICES: A COMPARISON OF ANALYSIS AND EXPERIMENT. Appendices included
W. J. Eich, H. T. Williams, Jr., and H. Aisu. [1962] 97p
Contract AT(30-1)3064
OTS $8.60

DESCRIPTORS: *Control rods, *Reactor lattice parameters

CVNA-147
Westinghouse Electric Co., Pittsburgh, Pa.
THE NUCLEAR DESIGN OF THE CVTR CORE
Herbert C. Hecker, Jr. Jul 62, 144p
Contract AT(30-1)2289
OTS $11.00

DESCRIPTORS: *Reactor cores

Nuclear Reactions

AD-426 561
Michigan Univ., Ann Arbor. Coll. of Literature, Science and the Arts.
A STATISTICAL INTERPRETATION OF LARGE ANGLE PROTON-PROTON ELASTIC SCATTERING.
Technical rept. no. 14
Lawrence W. Jones. 20 Dec 63, 4p
Contract Nonr-1224(23)
ORA Proj. 03106
OTS $1.10

DESCRIPTORS: *Nuclear cross sections, *Proton scattering, *Elastic scattering, Quantum statistics, Probability

CONF-52-3
Wisconsin Univ., Madison.
ATOMIC EFFECTS ON NUCLEAR REACTION YIELD CURVES
R. G. Herb. [1963] 22p
Contract AT(11-1)GEN-7
OTS $2.60

DESCRIPTORS: Nickel, Aluminum, Isotopes, Protons, *Nuclear reactions

International Conference on Nuclidic Masses, IAEA, Vienna, Austria, Jul 63.

PHYSICS

PB-165 273
Aerospace Corp., El Segundo, Calif.
ENERGY TRANSFER PROCESSES IN A PARTIALLY IONIZED, TWO-TEMPERATURE GAS.
Donald M. Dix. 2 Mar 64, 64p
Rept. no. ATN-64(9232)-1
OTS $6.60

DESCRIPTORS: Plasma physics, *Plasma sheath, Gas ionization, Electrons, Ions, Transport properties, *Heat transfer, Thermal conductivity, Electric fields, Magnetic fields.

The elementary situation of convective energy transfer between parallel plates at different temperatures is analyzed for partially ionized, nonreacting, monatomic hydrogen wherein the electrons may be at a temperature different from that of the heavier species. The gas conditions considered are such that an ion sheath, less than a mean free path in spatial extent, forms on the fully catalytic colder surface. The numerical results obtained indicate that: (1) the gross features of the continuum solution are rather insensitive to the models of sheath and transition regions employed; (2) the energy transfer between ions and electrons due to the electric field external to the sheath is appreciable, particularly in its effect of reducing electron temperature; (3) thermal nonequilibrium effects on total heat transfer are not as great as might be anticipated, due to energy transfer between species by electric fields and the contribution of diffusional processes; (4) magnetic field effects on total heat transfer are less than the effect on electronic thermal conductivity would indicate and are lessened further by thermal nonequilibrium effects. (Author)

AD-420 450
Aerospace Research Labs., Office of Aerospace Research, Wright-Patterson AFB, Ohio.
PROCEEDINGS OF THE PLASMA ARC SEMINAR OF THE THERMO-MECHANICS RESEARCH LABORATORY (NO. 1), HELD 17, 18 AND SEPTEMBER 1962. Rept. on Mechanics of Flight Sep 63, 613p
ARL-63-151; N63-23471
OTS $7.00

DESCRIPTORS: *Plasma physics, *Conferences, *Plasma sheath, Electrodes, *Heat transfer, *Gas discharges, Discharge tubes, *Electric arcs, Hypersonic wind tunnels, Electromagnetic waves, Thermodynamics, Spectroscopy, Atmosphere entry, *Plasma jets, Magnetic fields, Particle accelerators, Fluid mechanics, Arc-jet engines.

Contents:
On the sheath of hollow anodes, by Robert C. Dean, Jr.
Sheath phenomena on transpiration cooled arc anodes, by Charles Sheer
Anode heat transfer and characteristics of plasma streams, by E. R. F. Winter
An experimental investigation of a vortex-stabilized long alternating current arc discharge, by T. Andrada and Kurt A. Erfurth
Vortex stabilized hydrogen arcs, by Werner Bez
Interaction between electric arcs and gas flows, by Eric Baum and Gordon L. Cann
Plasma acceleration by traveling magnetic fields, by Eugene E. Covert
Theory of the electrode components of the arc discharge, by G. Ecker
The space charge region near the arc cathode, by T. H. Lee
A microwave diagnosis of a cylindrical plasma with alkali metal injection-electrical conductivity, by Daniel N. Cheatham, Jr., and James A. Nicholls
Review of the status of knowledge of high temperature transport and thermodynamic properties of selected gases, by Boris Ragent
Radiation characteristics of metal vapors, by Alfred E. Wechsler
Research on radiation from arc heated plasma: nitrogen, by James C. Morris and G. R. Bach
Radiant heat transfer in absorbing, emitting, and scattering media, by Tom J. Love
Radiation from an alternating current arc, by Paul W. Schreiber
Some spectrometric and spectroradiometric measurements of temperatures in plasmajets, by R. H. Tourin, L. R. Ryan, and H. J. Babrov
Energy addition to a flowing gas by high-repetition-rate, arrested-breakdown discharges, by H. C. Early and W. N. Lawrence
A review of magnetically induced motion of electric arcs, by Walter E. Knabe
Some observations on the motion of electric arcs in transverse magnetic fields, by Ward C. Roman
Heat transfer from plasmas in the presence of magnetic fields, by Stuart A. Gordon
Laminar and turbulent mixing of field-free plasma, by Jerry Grey
A miniature enthalpy probe, by Frederick C. Haas.

TID-19137
Georgia Inst. of Tech., Atlanta.
PRODUCTION OF SLOW ELECTRONS AND POSITIVE IONS IN He, Ne, Ar, H_2, N_2, O_2, AND CO BY ENERGETIC HELIUM IONS
D. W. Martin, R. A. Langley, J. W. Hooper, D. S. Harmer, and E. W. McDaniel. [1962] 20p
Contract AT(40-1)2591
OTS $1.60

DESCRIPTORS: *Helium, *Ions, *Electrons.

NASA-TN-D-2264
Lewis Research Center, National Aeronautics and Space Administration, Cleveland, Ohio
EFFECTS OF CESIUM VAPOR ON BAYARD-ALPERT IONIZATION GAGES AT PRESSURES LESS THAN 10^{-5} TORR
Robert L. Summers. Mar 64, 17p
N64-17728
OTS $0.50

AD-428 310 repriced
McDonnell Aircraft Corp., St. Louis, Mo.
ANALYSIS OF PLASMA GENERATORS. Final rept., May-Nov 63, on Telemetry and Command Destruct Techniques
Donald R. Hesser. 16 Jan 64, 227p
Contract AF33(657)11464
Rept. no. A220; RTD-TDR-63-4222
OTS $3.50

DESCRIPTORS: *Plasma sheath, Simulation, *Generators, Analysis, *Atmosphere entry, Re-entry vehicles, *Telemetering antennas, Electromagnetic waves, Propagation, Radiofrequency generators, Discharge tubes, Shock tubes, Hypersonic wind tunnels, Electric arcs.

The report is an evaluation of existing plasma generators in terms of their capability of providing experimental data, useful to the determination of telemetry plasma sheath interactions, and the formulation of techniques for testing telemetry under simulated re-entry conditions. The plasma characteristics of typical re-entry plasmas were calculated to delineate the range of parameters to be simulated. Electromagnetic wave propagation and antenna effects were reviewed to establish the parameters to be studied in the experimental tests. The plasma generators studied were: radio frequency plasma generators, low density plasma generators, glow discharge tubes, shock tubes, electromagnetic shock tubes, hypervelocity impulse tunnels, shock tunnels, arc heated wind tunnels, and free flight ranges. These were categorized according to electron concentration, collision frequency, operating pressure, cost, geometric size, test time, and frequency of operation. Tests were formulated to evaluate reflection, and attenuation effects, information rate, modulation parameters, antenna breakdown, and also complete systems. (Author)

AD-425 844
Naval Ordnance Lab., White Oak, Md.
THE UNCERTAINTY PRINCIPLE FOR ANGLE AND ANGULAR MOMENTUM
Joshua H. Rosenbloom. 10 Oct 63, 24p
NOLTR-63-207
OTS $0.75

DESCRIPTORS: *Momentum, Rotation, Operators (Mathematics), Groups (Mathematics), *Quantum mechanics, Probability,

The major result of the report is to show how, in the transition to rotations, to modify the Heisenberg Uncertainty Principle and the associated commutator relation. It should prove useful where the quantum mechanics of rotations is involved. (Author)

Electricity and Magnetism

PB-165 300
California Univ., Los Angeles.
GENERALIZED OPERATIONAL CALCULUS FOR TIME-VARYING NETWORKS, PARTS 1 AND 2
E. C. Ho and H. Davis. Jul 54, 47p
Contract N6onr-275-16
Dept. of Engineering rept. no. 54-71; AD-43 913
OTS $4.60

DESCRIPTORS: *Integral transforms, *Electrical networks, Transformations (Mathematics), Differential equations, Synthesis, Mathematical analysis.

A summary is presented of the results of an extension of the technique of Aseltine (PB 144 286) for obtaining the direct integral transformation for time-varying networks. A general method is described for finding the inverse transformation integral once the direct transformation integral is known. The existence and applicability of a transform for a given time-varying network is considered in detail. Consideration is given (1) to those integral transformations which generate an operational calculus for general linear differential operators, and (2) to the application of such transformations to the analysis and synthesis of a class of linear time-varying networks. (Author)

AD-291 499
California Univ., Riverside.
SPIN WAVE-ELECTRON INTERACTIONS IN MAGNETIC SOLIDS. Technical rept. no. 1
Thomas W. Wolfram, Doctoral thesis. 13 Aug 62, 154p
[Grants] AFOSR 61-70 and AFOSR 62-318
AFOSR-4073; N63-10159
OTS $11.50

DESCRIPTORS: *Quantum mechanics, *Ferromagnetic materials, *Antiferromagnetism, *Field theory, Hamiltonian, *Electrons, Atomic energy levels.

TID-19071
Clevite Corp., Cleveland, Ohio.
RESEARCH ON PIEZOELECTRIC MATERIALS AND PHENOMENA. Annual progress rept. for 1 Feb-31 Dec 62
D. A. Berlincourt and H. H. A. Krueger. 15 Apr 63, 244p
Contract AT(29-1)789
SCDC-3261
OTS $16.00

DESCRIPTORS: *Piezoelectric crystals, *Lead, *Zirconates, *Titanates.

Electronics

PB-165 267
Microwave Devices Lab., Univ. of Utah, Salt Lake City.
CHARACTERISTICS OF A MERCURY-ARC DISCHARGE IN A MAGNETIC FIELD. Technical rept. NSF-5, on Microwave Devices
Verle A. Gilson and Curtis C. Johnson. Aug 63, 77p
Granst NSF G-15017 and NSF GP-843
OTS $7.60

DESCRIPTORS: *Plasma physics, *Mercury, *Electric discharges, *Magnetic fields, Microwaves, Propagation, Waveguides, Probes (Electromagnetic)

The main purpose of this work is to generate and diagnose plasma columns suitable for microwave research on waveguides containing plasmas with an axial magnetic field as a parameter. Mercury arc discharges are used for the plasma sources. While diagnosing these plasmas to obtain the parameters for the microwave research, data are obtained from a 0.38 cm diameter mercury arc discharge with no magnetic field applied and compared with Klarfeld's predictions. Also, some characteristics of a 1 cm diameter mercury arc discharge are obtained and plasma densities, determined by Langmuir double probes, are compared with those determined by microwave resonant cavities with an axial magnetic field as a parameter. (Author)

MATT-135
Plasma Physics Lab., Princeton Univ., N. J.
FURTHER STUDIES OF PLASMA MOTION IN A CURVED MAGNETIC FIELD
H. P. Eubank and T. D. Wilkerson. Jul 62, 21p
Contract AT(30-1)1238
OTS $2.60

DESCRIPTORS: *Plasma physics, *Magnetic fields,

MATT-130
Plasma Physics Lab., Princeton Univ., N. J.
A RIGOROUS CALCULATION OF THE HIGH FREQUENCY CONDUCTIVITY OF A FULLY IONIZED PLASMA
Carl Oberman, Amiram Ron, and John Dawson. Jul 62, 32p
Contract AT(30-1)1238
OTS $3.60

DESCRIPTORS: *Plasma physics, *Electrical conductance

Molecular Physics and Spectroscopy

TID-19123
Lyman Lab. of Physics, Harvard Univ. Cambridge, Mass.
MAGNETIC RESONANCE STUDIES OF UNPAIRED ATOMS IN SOLID D_2
Mark Sharnoff and R. V. Pound. [1962] 76p
Contract AT(30-1)2382
OTS $7.60

DESCRIPTORS: *Resonance, Molecular spectroscopy, *Deuterium.

AD-423 323
Ohio State Univ. Research Foundation, Columbus.
SPECTROGRAPHIC ANALYSIS OF PLASMA FLOWS
E. S. Fishburne and S. L. Petrie. Sep 63, 89p
Contract AF33(657)7561
ASD-TDR-63-98; N64-12595
OTS $2.25

DESCRIPTORS: *Plasma physics, *Wind tunnels, Heating, Electric arcs, Plasma medium, Argon, Jets, Temperature, Spectroscopy, Line spectrum, *Electron transitions, Probability.

Both experimental and theoretical studies are reported relating to the spectrographic determination of the temperature and species concentration distributions across the nozzle exit of an arc heated with tunnel. A detailed review of the basic theory of spectral line intensities is presented and the various spectrographic techniques for the determination of gas temperatures and species concentrations are given. The performance characteristics of the arc tunnel operating with argon are summarized and the effects of various configurations on the basic performance are described. Spectrographic analyses of the exhaust jet are reported. The results indicate that some degree of non-equilibrium electronic excitation was present at the nozzle exit. The gas temperatures obtained from rotational spectra agree reasonably well with theoretical predictions. (Author)

NYO-10691(Pt. 1)
Rensselaer Polytechnic Inst., Troy, N. Y.
A SPECTROSCROPIC STUDY OF THE ALPHA RAY INDUCED LUMINESCENCE IN GASES. PART I
P. Harteck, S. Dondes, and C. O. Kunz. Sep 63, 116p
Contract AT(30-3)321
OTS $9.60

DESCRIPTORS: *Gases, *Luminescence, Radiation effects, Alpha particles

Optics

AD-421 838
Baird-Atomic, Inc., Cambridge, Mass.
WIDE BAND COHERENT LIGHT MODULATOR.
Final rept., Jul 62-Jun 63
Sep 63, 142p
Contract AF33(657)9209
Rept. no. 4067/Final; ASD-TDR-63-604
OTS $2.75

DESCRIPTORS: Broadband, *Light, *Modulators, Interferometers, Crystals, Electrical properties, Optical properties, Design.

A thorough analysis is made of the theoretical factors affecting Fabry-Perot interferometers containing electro-optical crystals as phase-shifting elements and used as wideband modulators of coherent light. Bandwidth, modulation percentage and distortion, optical transmission, the effect of optical imperfections and modulator amplifier characteristics are discussed. Descriptions of two experimental modulators based on the results of this analysis are included. The design of a wideband distributed amplifier to drive the final modulator is discussed. The characteristics of this modulator were investigated at low frequencies with a mercury vapor light source and at frequencies up to 30 megacycles with a continuous gas laser operating at 6328Å. Results of final tests indicate a modulation sensitivity one third of that expected, but a flat pass band out to 30 megacycles. It is suggested that direct experimental verification of the transmission functions and maximum modulation frequencies be made. (Author)

N64-16757
IIT Research Inst., Chicago, Ill.
INVESTIGATION OF LIGHT SCATTERING IN HIGHLY REFLECTING PIGMENTED COATINGS.
Quarterly rept., 1 Oct 63-1 Jan 64
G. A. Zerlaut, S. Katz, and J. Stockham. 29 Jan 64, 45p
Contract NASr-65(07)
Rept. no. IITRI-C6018-6; NASA CR-53118
OTS $4.60

DESCRIPTORS: *Coatings, Pigments, *Reflection, *Light, Scattering,

ORNL-3468
Oak Ridge National Lab., Tenn.
OPTICAL EMISSION FROM ELECTRON IRRADIATED THIN GOLD FOILS
D. C. Hammer, E. T. Arakawa, L. C. Emerson, and R. D. Birkhoff. 10 Sep 63, 67p
Contract W7405-eng-26
OTS $2.60

DESCRIPTORS: *Gold, *Foils, *Diffraction gratings, Optical properties.

Solid State Physics

AD-296 277
Bell Telephone Labs., Inc. [Whippany, N. J.]
MICROWAVE DIODE RESEARCH. Rept. no. 10 (Quarterly progress rept. no. 1) 10 Jun-9 Sep 62
J. J. Chang, C. R. Crowell, L. A. D'Asaro, J. H. Forster, and D. Leenov. 10 Dec 62, 74p
Contract DA36-039-sc-89205, continuation of Contract DA36-039-sc-85325
OTS $7.60

DESCRIPTORS: *Microwaves, *Diodes (Semiconductors), *Crystals, Semiconductor devices, Direct current, Oscillators, Silicon, Scientific research, Varactor diodes.

Calculations are made of the nonlinearity coefficient γ, and the dynamic quality factor $\tilde{Q}$ of abrupt junctions, hyperabrupt junctions, and varactors with a "pagoda" structure which is proposed in this report. Measured capacitance-voltage characteristics of developmental hyperabrupt junctions and pagoda varactors are discussed. A PIN diode protector is discussed which, while developed for a particular system, promises to have wide applicability. To investigate its potentialities an analysis of PIN diode behavior under the action of dc forward bias and high-level microwave power is presented. It is shown that the PIN is a much better protector when operated with dc bias than it is in unbiased operation. The measurement of semiconductor diode parameters by harmonic generation is discussed. An analysis of corrections for the effect of large percentage modulation, second harmonic distortion in the current generator and variation of diode parameters with current is carried out. (Author)

PB-165 269
California, Univ., Riverside.
THEORY OF SCATTERING IN SOLIDS. Technical rept. no. 2
Joseph Callaway [1963] 53p
[Grant] AFOSR 62-316
OTS $5.60

DESCRIPTORS: *Crystal lattice defects, *Phonons, Scattering, *Quantum mechanics, *Field theory, *Electrons.

The general theory of the scattering of excitations in solids by localized imperfections is discussed. The solid state analog of the usual partial wave expansion of the scattering amplitude is derived. In an appendix, the applicability of the general theory to phonons and spin waves as well as electrons is demonstrated. (Author) (See also PB-165 270)

NASA-TN-D-2098
Goddard Space Flight Center, National Aeronautics and Space Administration, Greenbelt, Md.
SOLAR CELL RADIATION DAMAGE STUDIES WITH 1 MEW ELECTRONS AND 4.6 MEV PROTONS
William R. Cherry and Luther W. Slifer. Feb 64, 28p
N64-15845; N64-11382 superseded
OTS $0.75

DESCRIPTORS: *Solar cells, *Radiation damage, Electrons, Protons, Semiconductors, Silicon.

TID-16340
Illinois Univ., Urbana.
LATTICE POINT DEFECT CONFIGURATIONS INCLUDING THEIR DEPENDENCE ON ELECTRON REDISTRIBUTION. Technical rept. no. 31
K. H. Bennemann and J. S. Koehler. Jul 62, 22p
Contract AT(11-1)182
OTS $2.60

DESCRIPTORS: *Crystal lattice defects, *Crystals,

UCRL-11220
Lawrence Radiation Lab., Univ. of California, Berkeley.
EFFECT OF HIGH PRESSURE ON THE ELECTRICAL RESISTANCE OF Bi, Yb, AND Dy
Philip Clark Souers. Doctoral thesis. 24 Jan 64, 79p
Contract W7405-eng-48
OTS $2.00

DESCRIPTORS: Bismuth, Ytterbium, Dysprosium, *Resistance (Electrical)

LADC-5373
Los Alamos Scientific Lab., N. Mex.
THE CRYSTAL STRUCTURE OF BETA PLUTONIUM METAL
W. H. Zachariasen (Univ. of Chicago) and F. H. Ellinger. [1961] 27p
Contract W7405-eng-36
OTS $2.60

DESCRIPTORS: *Plutonium, *Crystal structure,

LADC-5363
Los Alamos Scientific Lab., N. Mex.
THE CRYSTAL STRUCTURE OF Pu_3Co
Allen C. Larson, Don T. Cromer, and R. B. Roof, Jr. [22 Aug 62] 11p
Contract W7405-eng-36
OTS $1.60

DESCRIPTORS: *Cobalt alloys, *Crystal structure, *Plutonium alloys,

N64-16744
Massachusetts Inst. of Tech., Cambridge.
RAMAN AND PHONON MASERS
R. Y. Chiao, E. Garmire, and C. H. Townes. 1963, 29p
Grant NsG-330
NASA CR-53103
OTS $2.60

DESCRIPTORS: *Masers, Microwave amplifiers, Light, Raman spectroscopy, *Phonons, Optics, *Lasers.

Presented at Summer School Session of the International School of Physics "Enrico Fermi" Verenna, Italy, Aug. 63.

AD-427 081 repriced
Naval Ordnance Lab., White Oak, Md.
THEORETICAL EQUATION OF STATE FOR FACE CENTERED CUBIC METALS
D. J. Pastine. 7 Aug 63, 27p
NOLTR-63-108; N64-13815
OTS $1.00

DESCRIPTORS: *Metallic crystals, *Equations of state, Metals, *Aluminum, *Copper, *Magnesium, *Silver, *Zinc, Crystal lattices, Thermodynamics, Equations, Functions.

A Morse function is used as the form of the volume dependent energy term in the expression for the Helmholtz free energy of a Debye solid. The consequent form of the Mie-Gruneisen equation of state is then obtained using an adjusted form of the Slater relation for the Gruneisen parameter. Theoretical Hugoniots are then calculated for Al, Cu, and Ag and found to agree well with experimental Hugoniots over a broad pressure range. (Author)

CONF-50-14
Oak Ridge National Lab., Tenn.
DISLOCATION MOVEMENT IN SINTERING OF CALCIUM FLUORIDE
C. S. Morgan and C. S. Yust. [1961] 15p
Contract W7405-eng-26
OTS $1.60

DESCRIPTORS: *Calcium, *Fluorides, *Crystals, *Sintering.

American Ceramic Society Annual Meeting, Pittsburgh, Apr-May 63

CONF-166-9
Princeton Univ., N. J.
THE EFFECT OF IONIZING RADIATION ON THE OPTICAL AND ELECTRICAL PROPERTIES OF THE ALKALI HALIDES
B. S. H. Royce. [1962] 37p
Contract AT(30-1)937
OTS $3.60

DESCRIPTORS: *Alkali metals, *Halides, *Crystals, Radiation effects, Bibliographies

American Society for Testing Materials 66th Annual Meeting, Atlantic City, Jun 63

SCDC-3147
Sandia Corp., Albuquerque, N. Mex.
QUANTITATIVE DETERMINATIONS AND DESCRIPTIONS OF PREFERRED ORIENTATION
J. R. Holland. [Jul 63] 19p
Contract AT(29-1)789
CONF-174-2
OTS $1.60

Twelvth Annual Conference Application of X-Ray Analysis, Denver, Aug 63

TID-16351
Sandia Corp., Albuquerque, N. Mex.
SHOCK-INDUCED LUMINESCENCE IN QUARTZ
William P. Brooks. [1962] 17p
Contract AT(29-1)789 [1962]
OTS $1.60

N64-16716
Space Technology Labs., Inc., Redondo Beach, Calif.
CHARGED PARTICLE RADIATION DAMAGE IN SEMICONDUCTORS, IX: PROTON RADIATION DAMAGE IN SILICON SOLAR CELLS. Final rept.
J. M. Denny and R. G. Downing. 31 Aug 63, 40p
Contract NAS5-1851
Rept. no. 8653-6026-KU-000; NASA CR-55829
OTS $3.60

DESCRIPTORS: *Semiconductors, Silicon, *Solar cells, *Radiation damage, Charged particles, Protons.

TID-16526
Western Reserve Univ., Cleveland, Ohio.
POINT IMPERFECTIONS IN SODIUM METAL. Final technical rept.
Stefan Machlup. 1 Aug 62, 31p
Contract AT(11-1)493
OTS $3.60

DESCRIPTORS: *Sodium, *Crystal lattice defects.

Theoretical Physics

AGN-8088
Aerojet-General Nucleonics, San Ramon, Calif.
RUBIDIUM/CESIUM EVALUATION PROGRAM. Quarterly progress rept. for 1 Apr-30 Jun 63
C. R. Fisher and P. Y. Achener. 22 Jul 63, 39p
Contract AT(04-3)368
OTS $3.60

DESCRIPTORS: *Heat transfer, Rubidium.

NASA-CR-27
Cornell Aeronautical Lab., Inc., Buffalo, N. Y.
MEASUREMENT OF RADIATIVE HEAT TRANSFER WITH THIN-FILM RESISTANCE THERMOMETERS
Leonard Bogdan. Mar 64, 46p
Contract NAS8-823
N64-17771
OTS $1.25

GEAP-4258
General Electric Co., San Jose, Calif.
HEAT TRANSFER TO SUPERHEATED STEAM
W. A. Sutherland. May 63, 26p
Contract AT(04-3)189
OTS $2.60

DESCRIPTORS: *Steam, *Heat transfer

N64-16106
Georgia Inst. of Tech. Engineering Experiment Station, Atlanta.
HEAT TRANSFER TO A GAS CONTAINING A CLOUD OF PARTICLES. Semi-annual status rept. no. 3, 1 Jun-30 Nov 63
Andrew McAlister, Henderson C. Ward, Alberto F. Hidalgo, and Clyde Orr, Jr. 10 Jan 64, 59p
Grant NsG-273-62
NASA CR-55518
OTS $5.60

DESCRIPTORS: *Heat transfer, Particles, Aerosols, Gases, Zinc compounds, Iron compounds, Sulfides, Measurement,

NASA-TN-D-2116
Lewis Research Center, National Aeronautics and Space Administration, Cleveland, Ohio
WALL TEMPERATURES IN A TUBE WITH FORCED CONVECTION, INTERNAL RADIATION EXCHANGE, AND AXIAL WALL HEAT CONDUCTION
Robert Siegel and Edward G. Keshock. Mar 64, 42p
N64-16929
OTS $1.00

DESCRIPTORS: *Heat exchangers, *Heat transfer coefficients, *Convection, Thermal conductivity, Integral equations, Nonlinear differential equations,

NASA-TN-D-2246
Michigan Univ., Ann Arbor,
THEORETICAL STUDIES OF A RADIATION-BALANCE
Michael T. Surh and Melvin G. Whybra. Apr 64, 54p
Contract NASr-54(03), supersedes Contract NASw-140
N64-17749
OTS $1.50

TID-17718
Nuclear Technology Lab., Stanford Univ., Calif.
HEAT TRANSFER TO A GAS AT HIGH TEMPERATURE. Technical rept. no. 247-1.
Monty E. Davenport and Patrick M. Magee. May 60, 77p
Contract AT(04-3)247
OTS $7.60

DESCRIPTORS: *Heat transfer, *Gas flow, Turbulence, Helium, Carbon dioxide, Oxygen.

PB-165 255
Purdue Univ., Lafayette, Ind. School of Aeronautical and Engineering Sciences.
HEATING OF THERMO-RHEOLOGICALLY SIMPLE VISCOELASTIC MEDIA DUE TO CYCLIC LOADING
R. A. Schapery. May 63, 51p
Contract AF04(611)8539, subcontract
Rept. no. A&ES-63-4; N63-22043
OTS $5.60

DESCRIPTORS: *Viscoelasticity, Materials, Loading (Mechanics), Shear stresses, Heating, Partial differential equations, Propellants, Thermodynamics.

Steady-state and transient temperature distributions resulting from dissipation are calculated for a viscoelastic slab and hollow cylinder subjected to cyclic shear loading. Temperature dependence of the dissipation function is introduced though the usual assumption of thermo-rheologically simple behavior, wherein frequency-dependent mechanical properties measured at different temperatures are superposed by shifting the logarithmic frequency scale. This assumption leads to a nonlinear heat conduction equation, and an exact closed-form solution is obtained for just the steady-state temperature distribution. In order to solve the transient problem, some approximate methods of analysis are proposed. Numerical results for a solid propellant are given, and it is found that a large temperature rise will occur as the result of a thermal instability when the shear stress is above a certain critical value. In this present paper inertia is neglected; however, many of the considerations, including the approximate methods, are potentially applicable to dynamic problems. (Author)

OTS SB-525
Office of Technical Services, Dept. of Commerce, Washington, D. C.
ANTHROPOMETRY. Dec 63, 12p
OTS Selective Bibliography SB-525
OTS $0.10

DESCRIPTORS: *Anthropometry, *Bibliographies, Stress (Physiology), Military personnel, Morphology (Biology)

Lists 128 references to reports added to the OTS collection through December 1963. Includes reports on: measurement of human body and its parts; body dimensions; sizing of clothing and personal equipment; design of seats, cockpits and other workplaces for military personnel; body measurements made during periods of stress, i.e., acceleration, deceleration, locomotion; biological and/or physiological effects of height, weight, and other body measurements; body typing methods.

Documentation

AD-428 423 repriced
Dayton Univ. Research Inst., Ohio.
ESTABLISHMENT OF A COORDINATE INDEXING RETRIEVAL SYSTEM FOR THE AIR FORCE MATERIALS LABORATORY. Final summary rept., 1 Dec 60-30 Nov 63
Edward A. Janning. Nov 63, 76p
Contract AF33(616)7698
RTD-TDR-63-4263
OTS $2.00

DESCRIPTORS: *Documentation, Military publications, *Information retrieval, *Subject indexing, Data processing systems,

A coordinate indexing system for a library containing over 10,000 documents has been established for the Air Force Materials Laboratory. The primary feature of this system is the ability to conduct either manual or computer searches. Manual searches are made using a dual dictionary that has been prepared by the University's NCR 304 computer. A thesaurus of over 18,000 multidisciplinary terms for this system has also been prepared. This report discusses in detail the indexing of documents using deep indexing with links and roles, the procedure used in editing the generated vocabulary, and, the various machine operations used in mechanizing the system. Briefly discussed are various studies made, or in the planning stage, to evaluate several aspects of the system; in particular, an evaluation of the use of links and roles in the retrieval of information. (Author)

PB-165 263
Engineers Joint Council, New York.
ACTION PLAN FOR IMPROVED DISSEMINATION OF ENGINEERING INFORMATION. Progress rept. no. 3, 7 Jan-1 Apr 63
Eugene Wall. 2 Apr 63, 17p
Grant NSF-G24836
OTS $1.60

DESCRIPTORS: *Documentation, *Information retrieval, *Subject indexing, Abstracts, Engineering.

Work is continuing on a terminological research study (which is expected to provide the basis for an Engineering Thesaurus) and upon training staff members of EJC society journals in abstracting and coordinate indexing techniques. As input to the terminological study, 18 engineering societies and other organizations have contributed about 119,000 terms. Of these, 13,948 were duplicated exactly by two or more contributors and have been selected for detailed investigation. A terminological study committee has been formed and organized into eleven subcommittees according to different technological interests. About 6,500 important engineering terms have been treated. No differences have arisen among engineering disciplines which have not been easily resolved--although many differences have arisen. A very large "overlap" in terminology used by the various disciplines has been noted. "Source" indexing and simultaneous publication of abstracts by seven societies and at least two commercial journals continues. (Author) (See also PB-163 258)

PB-165 262
Engineers Joint Council, New York.
ACTION PLAN FOR IMPROVED DISSEMINATION OF ENGINEERING INFORMATION. Progress rept. no. 4, 1 Apr-1 Jul 63
Eugene Wall. 1 Jul 63, 24p
Grant NSF-G24836
OTS $2.60

DESCRIPTORS: *Documentation, *Information retrieval, *Subject indexing, Abstracts, Engineering

Work is continuing on a terminological research study (which is expected to provide the basis for a Thesaurus of Engineering Terminology) and upon training staff members of EJC society journals in abstracting and coordinate indexing techniques: As input to the terminological study, 18 engineering societies and other organizations contributed about 119,000 terms. Of these, 13,948 were duplicated exactly by two or more contributors and were selected for detailed investigation. About 11,000 important engineering terms have been treated. No differences have arisen among engineering disciplines which have not been easily resolved-although many differences have arisen. A very large "overlap" in terminology used by the various disciplines has been noted. "Source" indexing and simultaneous publication of abstracts by eight societies and at least two commercial journals continues. (See also PB 165 263) (Author)

UCRL-7554
Lawrence Radiation Lab., Univ. of California, Livermore.
IBM 1401 COMPUTER PRODUCED AND MAINTAINED WEAPON DATA SUBJECT AUTHORITY DOCUMENT
James H. Kennedy. 23 Jan 64, 12p
Contract W7405-eng-48
OTS $0.50

DESCRIPTORS: *Documentation, *Subject indexing.

NAS-NRC-1148
Office of Documentation, NAS-NRC, Washington, D. C.
THE METALLURGICAL SEARCHING SERVICE OF THE AMERICAN SOCIETY FOR METALS, WESTERN RESERVE UNIVERSITY, AND EVALUATION. 1964, 102p
NAS-NRC $2.00

DESCRIPTORS: *Documentation, *Information retrieval, *Subject indexing, Abstracts, *Metallurgy, Bibliographies

In evaluating the American Society for Metals - Western Reserve University Metallurgical Searching Service, the Committee had parallel searches performed by different searching services competent in the field of metallurgy. It recommended two operations research studies on evaluation of information-retrieval systems and a survey of the users of the service. It endorsed experimentation by Center personnel in searching strategies. Descriptions of these tests and lists of results of the studies, together with comments, are given. A detailed bibliography on testing and evaluating information-retrieval systems is included. (Author)

AD-DIVISION INDEX

AD No.	Div.
430 472	15
430 473	15
430 474	15
430 475	15
430 476	15
430 477	15
430 478	25
430 479	25
430 480	5
430 484	14
430 485	15
430 486	14
430 487	6
430 490	30
430 491	30
430 492	17
430 493	22
430 495	15
430 496	6
430 501	14
430 502	24
430 503	2
430 504	2
430 509	25
430 510	30
430 511	15
430 512	32
430 513	30
430 515	30
430 516	6
430 521	16
430 522	15
430 523	6
430 524	15
430 525	26
430 527	25
430 528	15
430 529	16
430 531	6
430 532	1
430 533	12
430 534	25
430 535	30
430 536	25
430 537	16
430 538	5
430 541	6
430 542	5
430 543	1
430 546	16
430 547	25
430 549	16
430 550	30
430 551	30
430 552	14
430 560	25
430 561	22
430 573	17
430 574	16
430 576	4
430 579	30
430 580	25
430 581	5
430 582	30
430 583	17
430 584	25
430 586	1
430 587	25
430 588	6
430 589	12
430 591	22
430 592	20
430 593	15
430 596	20
430 597	6
430 598	25
430 599	15
430 600	2
430 601	30
430 602	5
430 603	30

AD No.	Div.
430 605	6
430 606	12
430 607	15
430 608	2
430 609	30
430 610	10
430 612	10
430 614	6
430 615	20
430 616	1
430 618	20
430 619	5
430 621	6
430 622	10
430 623	6
430 624	26
430 625	20
430 626	15
430 628	10
430 630	6
430 632	2
430 633	10
430 634	31
430 640	25
430 641	2
430 643	4
430 646	32
430 651	14
430 652	14
430 653	14
430 654	6
430 656	12
430 657	6
430 658	17
430 659	16
430 660	20
430 661	14
430 662	27
430 663	16
430 664	4
430 670	30
430 671	25
430 672	2
430 673	30
430 674	16
430 675	20
430 679	2
430 680	25
430 683	1
430 687	20
430 688	30
430 689	30
430 690	20
430 691	20
430 694	4
430 697	6
430 698	6
430 699	15
430 702	6
430 703	1
430 704	6
430 705	6
430 706	6
430 709	2
430 710	6
430 711	6
430 712	6
430 717	6
430 718	25
430 720	6
430 721	30
430 722	17
430 723	27
430 724	25
430 725	6
430 726	12
430 729	10
430 731	2
430 733	6
430 734	30

AD No.	Div.
430 735	20
430 736	5
430 737	5
430 738	5
430 739	30
430 742	22
430 743	2
430 744	14
430 749	25
430 751	27
430 752	25
430 753	12
430 754	17
430 760	22
430 764	10
430 770	10
430 773	6
430 774	20
430 775	6
430 777	2
430 778	2
430 779	24
430 782	17
430 783	32
430 784	10
430 785	1
430 786	2
430 787	2
430 788	2
430 789	2
430 790	5
430 791	6
430 792	20
430 793	5
430 794	2
430 795	31
430 796	4
430 797	6
430 798	6
430 799	2
430 800	25
430 801	24
430 802	30
430 803	1
430 804	10
430 805	6
430 806	14
430 807	30
430 809	27
430 810	25
430 811	14
430 812	6
430 814	15
430 816	6
430 818	5
430 819	22
430 821	30
430 826	25
430 829	14
430 832	2
430 834	25
430 836	15
430 837	30
430 840	10
430 841	6
430 847	5
430 848	10
430 849	25
430 850	30
430 851	32
430 852	32
430 853	10
430 855	10
430 856	1
430 858	31
430 859	6
430 860	6
430 862	25
430 863	26
430 866	10

AD No.	Div.
430 869	15
430 870	10
430 871	1
430 872	3
430 875	25
430 874	25
430 876	15
430 877	15
430 878	15
430 879	15
430 880	5
430 881	15
430 882	30
430 884	5
430 885	12
430 886	10
430 891	6
430 894	25
430 895	30
430 896	31
430 897	30
430 900	6
430 911	2
430 912	2
430 913	30
430 914	15
430 916	6
430 917	5
430 918	10
430 920	20
430 943	15
430 944	15
434 040	2
434 041	26
434 042	26
434 043	25
434 046	4
434 047	6
434 051	6
434 052	25
434 053	22
434 056	32
434 058	4
434 059	15
434 061	1
434 062	6
434 064	22
434 065	6
434 066	17
434 067	6
434 068	10
434 070	32
434 071	6
434 072	2
434 074	15
434 075	6
434 076	12
434 077	15
434 078	15
434 079	10
434 080	10
434 081	4
434 082	10
434 084	10
434 085	25
434 087	1
434 090	10
434 091	20
434 092	20
434 094	25
434 097	25
434 098	17
434 099	2
434 105	3
434 106	15
434 109	6
434 111	6
434 112	17
434 113	15
434 114	10

AD No.	Div.
434 115	16
434 116	16
434 118	13
434 120	15
434 126	22
434 127	25
434 129	27
434 140	22
434 142	31
434 146	6
434 151	25
434 153	2
434 154	2
434 155	25
434 156	25
434 158	30
434 163	11
434 165	12
434 166	25
434 167	12
434 169	3
434 170	6
434 173	14
434 175	26
434 176	2
434 178	27
434 182	5
434 183	1
434 185	31
434 188	8
434 190	8
434 191	2
434 192	25
434 193	29
434 195	12
434 204	14
434 205	2
434 207	17
434 208	15
434 209	6
434 210	15
434 211	26
434 212	17
434 213	14
434 214	17
434 217	13
434 218	25
434 219	16
434 220	12
434 222	13
434 225	15
434 227	19
434 228	25
434 229	4
434 230	4
434 231	26
434 232	0
434 234	17
434 235	6
434 236	6
434 239	4
434 240	6
434 242	15
434 247	17
434 248	30
434 251	26
434 254	15
434 255	32
434 256	15
434 258	9
434 260	30
434 262	4
434 263	6
434 266	16
434 269	4
434 270	12
434 271	13
434 272	0
434 271	20
434 276	16
434 279	20
434 280	14
434 285	4

AD No.	Div.
434 287	4
434 288	31
434 289	27
434 291	31
434 298	16
434 299	4
434 300	1
434 301	22
434 302	1
434 304	25
434 307	16
434 322	6
434 323	12
434 324	12
434 325	25
434 327	3
434 328	31
434 329	6
434 335	5
434 336	12
434 343	25
434 344	25
434 345	6
434 346	2
434 347	25
434 348	12
434 350	14
434 351	8
434 352	6
434 354	7
434 355	15
434 357	30
434 358	25
434 366	25
434 369	27
434 372	25
434 376	25
434 379	2
434 380	30
434 383	17
434 384	2
434 385	25
434 386	25
434 387	25
434 391	25
434 396	12
434 397	17
434 398	6
434 400	24
434 401	6
434 402	6
434 404	25
434 412	2
434 414	15
434 417	25
434 424	16
434 425	16
434 426	16
434 430	8
434 437	26
434 441	17
434 442	4
434 443	8
434 446	20
434 447	22
434 448	17
434 450	26
434 452	30
434 453	15
434 459	16
434 467	25
434 498	25
434 500	32
434 501	2
434 514	25
434 538	4
434 539	30
434 540	2
434 541	7
434 543	6
434 544	30
434 549	25
434 553	6
434 554	5

AD No.	Div.
434 555	4
434 556	30
434 557	4
434 559	30
434 560	25
434 561	15
434 563	9
434 564	15
434 565	25
434 566	2
434 569	25
434 572	23
434 573	6
434 574	25
434 575	6
434 576	6
434 577	15
434 579	6
434 580	22
434 581	31
434 583	25
434 586	25
434 587	7
434 592	10
434 593	25
434 600	14
434 601	14
434 611	6
434 658	6
434 660	22
434 664	3
434 666	15
434 670	30
434 672	29
434 673	2
434 674	8
434 675	30
434 679	25
434 680	6
434 682	25
434 684	16
434 696	6
434 699	25
434 700	8
434 701	31
434 702	22
434 703	31
434 704	25
434 705	2
434 706	7
434 708	30
434 709	25
434 712	25
434 713	16
434 714	4
434 715	15
434 716	25
434 717	9
434 718	25
434 720	16
434 729	16
434 734	8
434 736	25
434 746	25
434 747	6
434 748	30
434 749	30
434 751	17
434 754	13
434 756	25
434 757	25
434 759	6
434 760	30
434 761	25
434 762	8
434 764	25
434 765	25
434 766	6
434 767	30
434 768	30
434 769	24
434 770	25
434 771	6

AD No.	Div.
434 772	25
434 773	25
434 775	25
434 776	2
434 778	2
434 779	2
434 781	6
434 782	15
434 784	6
434 785	20
434 787	20
434 788	20
434 790	25
434 792	30
434 793	5
434 794	6
434 795	25
434 797	9
434 798	16
434 799	1
434 800	1
434 803	15
434 805	25
434 807	15
434 814	4
434 815	14
434 816	23
434 817	32
434 819	6
434 821	22
434 823	9
434 825	23
434 826	6
434 831	22
434 833	30
434 834	30
434 835	5
434 836	5
434 841	9
434 842	25
434 844	30
434 845	25
434 846	15
434 850	6
434 856	5
434 859	23
434 861	27
434 862	1
434 864	26
434 865	6
434 869	16
434 870	16
434 871	16
434 872	15
434 875	7
434 875	5
434 877	6
434 879	17
434 890	25
434 891	13
434 892	27
434 893	14
434 894	25
434 895	30
434 896	14
434 898	15
434 904	4
434 905	4
434 907	25
434 908	0
434 909	7
434 910	8
434 911	25
434 912	4
434 913	33
434 914	17
434 917	13
434 920	16
434 921	16
434 922	23
434 924	30
434 931	16
434 936	2

AD No.	Div.
434 939	17
434 940	17
434 941	2
434 942	25
434 943	25
434 944	27
434 945	26
434 946	25
434 947	27
434 948	16
434 949	2
434 950	25
434 951	25
434 952	9
434 953	20
434 954	2
434 955	24
434 956	24
434 957	25
434 958	25
434 959	25
434 960	25
434 961	20
434 962	20
434 963	9

AD No.	Div.
434 964	20
434 965	9
434 966	10
434 967	6
434 968	12
434 969	17
434 970	25
434 971	12
434 972	4
434 973	25
434 974	17
434 975	9
434 976	9
434 977	9
434 978	17
434 979	30
434 980	4
434 982	4
434 985	10
434 987	17
434 989	17
434 990	9
434 991	12
434 992	9
434 993	25

AD No.	Div.
434 994	9
434 995	1
434 996	15
434 997	17
434 998	25
435 001	6
435 006	2
435 007	12
435 008	1
435 015	25
435 017	24
435 018	24
435 019	34
435 020	24
435 021	17
435 024	19
435 025	25
435 030	16
435 031	1
435 034	20
435 036	14
435 037	12
435 038	18
435 039	15

AD No.	Div.
435 042	25
435 043	30
435 044	14
435 045	16
435 046	30
435 049	6
435 050	26
435 051	2
435 052	2
435 055	30
435 056	2
435 058	31
435 061	9
435 070	30
435 076	15
435 077	13
435 078	9
435 079	25
435 080	30
435 084	12
435 087	4
435 094	6
435 095	6
435 097	6

NUMBER INDEX

Number	Page
AD-43 913	S-52
AD-212 577	S-12
AD-228 469	S-17
AD-239 962	S-12
AD-243 399	S-24
AD-246 517	S-15
AD-246 925	S-28
AD-247 120	S-30
AD-251 221	S-13
AD-252 163	S-11
AD-267 051 superseded	S-16
AD-273 688 superseded	S-16
AD-278 647 superseded	S-16
AD-291 477 superseded	S-16
AD-291 499	S-52
AD-294 927	S-22
AD-296 277	S-54
AD-297 773	S-28
AD-411 245 superseded	S-16
AD-416 633	S-30
AD-419 160	S-32
AD-419 686	S-10
AD-420 450	S-51
AD-421 029	S-37
AD-421 049	S-14
AD-421 054	S-16
AD-421 084	S-26
AD-421 838	S-53
AD-421 905	S-37
AD-421 951	S-18
AD-421 973	S-25
AD-422 028	S-26
AD-422 242	S-26
AD-422 666	S-5
AD-423 323	S-53
AD-423 383	S-4
AD-423 386	S-4
AD-423 526	S-37
AD-423 556	S-9
AD-423 675	S-22
AD-423 688	S-19
AD-423 898	S-31
AD-423 952	S-38
AD-424 466	S-36
AD-424 518	S-22
AD-424 853	S-27
AD-424 860	S-23
AD-424 861	S-29
AD-424 863	S-29
AD-425 122	S-17
AD-425 147	S-25
AD-425 361	S-17
AD-425 474	S-39
AD-425 499	S-21
AD-425 547	S-39
AD-425 604	S-35
AD-425 844	S-52
AD-425 878	S-15
AD-425 922	S-39
AD-425 948	S-37
AD-426 185	S-28
AD-426 255	S-38
AD-426 264	S-38
AD-426 294	S-29
AD-426 344	S-38
AD-426 365	S-26
AD-426 466	S-23
AD-426 561	S-51
AD-426 772	S-10
AD-426 776 repriced	S-14
AD-426 882 repriced	S-15
AD-427 070 repriced	S-16
AD-427 081 repriced	S-55
AD-427 104 repriced	S-27
AD-427 297 repriced	S-19
AD-427 343 repriced	S-39
AD-427 355 repriced	S-31
AD-427 919 repriced	S-32
AD-428 006 repriced	S-27
AD-428 310 repriced	S-52
AD-428 423	S-57
AD-429 135 repriced	S-16
AD-429 136 repriced	S-19
AD-429 924 repriced	S-13
AD-433 506	S-18
AD-433 506	S-18
A&ES-63-4	S-56
AFFTC-TR-60-57	S-11
AFOSR-4073	S-52
AGN-8088	S-56
Allison-EDR-3709	S-13
AMRL-TDR-63-100	S-21
ARL-63-151	S-51
AROD-2458:4	S-28
AS-63-4	S-24
ASD-TDR-62-68 superseded	S-16
ASD-TDR-62-553 superseded	S-16
ASD-TDR-62-893 superseded	S-16
ASD-TDR-62-1056	S-22
ASD-TDR-63-98	S-53
ASD-TDR-63-355	S-30
ASD-TDR-63-394 superseded	S-16
ASD-TDR-63-604	S-53
ASD-TDR-63-715	S-16
ASD-TDR-63-753, pt. 1	S-26
ASD-TDR-63-863	S-14
ASD-TR-61-236 superseded	S-16
ATN-64(9227)-1	S-33
ATN-64(9227)-2	S-33
ATN-64(9232)-1	S-51
B-A-4067/Final	S-53
BAW-1164(Vol. V)	S-2
BBC-119	S-35
BCR-L-117	S-28
BNL-6202	S-5
BNL-6204	S-2
BNL-6207	S-41
BNL-6249	S-37
BNL-6279	S-7
BNL-7105	S-45
BNL-A-76	S-45
BRL-530	S-20
CCL-146	S-25
CCL-149	S-9
CISE-R-76	S-47
CONF-11-5	S-44
CONF-13-7	S-44
CONF-14-21	S-40
CONF-20-4	S-42
CONF-20-5	S-9
CONF-20-18	S-7
CONF-20-22	S-9
CONF-29-1	S-5
CONF-39-33	S-47
CONF-39-35	S-35
CONF-39-43	S-35
CONF-39-44	S-50
CONF-39-45	S-48
CONF-39-46	S-41
CONF-39-48	S-48
CONF-39-52	S-50
CONF-39-59	S-49
CONF-39-64	S-48
CONF-39-94	S-47
CONF-46-44	S-40
CONF-46-78	S-44
CONF-46-80	S-45
CONF-50-14	S-55
CONF-52-3	S-51
CONF-58-4	S-46
CONF-66-6	S-6
CONF-76-5	S-7
CONF-84-2	S-23
CONF-94-4	S-35
CONF-94-5	S-36
CONF-102-3	S-27
CONF-105-1	S-40
CONF-110-1	S-32
CONF-112-3	S-26
CONF-117-1	S-22
CONF-124-1	S-13
CONF-125-3	S-46
CONF-125-4	S-46
CONF-125-5	S-46
CONF-128-1	S-43
CONF-130-2	S-45
CONF-133-1	S-49
CONF-136	S-46
CONF-152-1	S-33
CONF-157-2	S-41
CONF-166-9	S-55
CONF-170-1	S-38
CONF-174-2	S-55
CSC-TR-63-2	S-30
CSC-TR-64-5	S-32
CVNA-147	S-50
DMIC-185	S-37
DMIC-186	S-38
DMIC-188	S-38
DMIC-189	S-38
DMIC-190	S-38
DMIC-191	S-39
DMIC-192	S-37
DMIC-193	S-39
DMIC-M-176	S-26
DMIC-M-179	S-39
DMIC-M-179	S-39
DMIC-M-183	S-35
EFINS-62-5(Rev.)	S-45
EFINS-62-17	S-45
EFINS-63-29	S-45
EFINS-63-32	S-41
EFINS-63-39	S-41
EURAEC-612	S-47
EURAEC-702	S-48
FA-M64-19-1	S-13
FCC-TR-47	S-19
FN-E-35	S-48
GA-3298	S-41
GA-4012	S-15
GEAP-4155	S-48
GEAP-4258	S-56
GEAP-4277	S-48
GEAP-4278	S-50
GNEC-210(Suppl. 3)	S-48
HADC-TM-56-5	S-20
HU-CL-TR-330	S-30
HW-73891(Rev.)	S-46
HW-74955	S-48
HWS-5937(Rev. 1)	S-25
HWS-5938(Rev. 3)	S-25
HWS-8240(Rev. 3)	S-25
HWS-8241(Rev. 4)	S-25
HW-SA-2509	S-6
HW-SA-2570	S-5
HW-SA-2588	S-4
HW-SA-2605	S-6
HW-SA-2613	S-5
HW-SA-2626	S-6
HW-SA-2632	S-7
HW-SA-2645	S-7
HW-SA-2653	S-6
HW-SA-2663	S-7
HW-SA-2982	S-41
IDO-14613	S-44
IDO-16932	S-50
IDO-28584(Add. 1)	S-47
IITRI-B6007-6	S-39
IITRI-C194-12	S-5
IITRI-C6018-6	S-54
IS-475	S-41
IS-483	S-3
IS-513	S-35
IS-527	S-31
IS-698	S-32
JPL-TR-522	S-1
JPL-TR-32-521	S-31
JPL-TR-32-560	S-33
LA-2235	S-43
LA-2989	S-40
LA-3035	S-8
LADC-5128	S-8
LADC-5209	S-6
LADC-5278	S-6
LADC-5330	S-36
LADC-5357	S-8
LADC-5359	S-46
LADC-5363	S-55
LADC-5373	S-55
LADC-5375	S-8
LADC-5377	S-8
LADC-5380	S-36
LADC-5383	S-49
LADC-5401	S-6
LADC-5410	S-23
LADC-5411	S-8
LADC-5418	S-16
LADC-5428	S-36
LADC-5776	S-22
LADC-5851	S-40
LAMS-2963	S-49
LAMS-3012	S-49
LAMS-3027	S-32
LAMS-3034	S-6
MAB-197-M	S-27
MAC-A220	S-52
MAC-A405	S-22
MATT-130	S-53
MATT-135	S-53
MH-Aero-61933-2	S-22
MH-MPG-1541-TR-12	S-25
MH-MPG-1541-TR-13	S-24
MH-MPG-1541-TR-14	S-24
MH-MPG-1514-TR-16	S-24
MITNE-35	S-49
ML9UM)-8265	S-2
ML(UM)-64038	S-2
MSAR-63-117	S-40
N62-15440	S-53
N63-10159	S-52
N63-10422 superseded	S-16
N63-13487	S-28
N63-19216	S-48
N63-19337	S-30
N63-22043	S-56
N63-23471	S-51
N63-23719	S-25
N64-10868	S-21
N64-10869-10881	S-21
N64-10882	S-21
N64-10883-10897	S-21
N64-11079	S-21
N64-11080-11089	S-21
N64-11111 superseded	S-1
N64-11301	S-34
N64-11382 superseded	S-54
N64-12249	S-35
N64-12260	S-37
N64-12325 superseded	S-16
N64-12364	S-9
N64-12595	S-53
N64-12704	S-18
N64-13190	S-30
N64-13301	S-38
N64-13311	S-36
N64-13646	S-23
N64-13657	S-14
N64-13671	S-38
N64-13672	S-37
N64-13719	S-21
N64-13755	S-15
N64-13815	S-55
N64-13832	S-38
N64-13839	S-39
N63-13845	S-39
N64-13970	S-38
N64-14314	S-25
N64-14653	S-32
N64-14962	S-16
N64-15068	S-27
N64-15091	S-19
N64-15100	S-27
N64-15577	S-28
N64-15790	S-33
N64-15834	S-54
N64-15963	S-18
N64-16106	S-56
N64-16107	S-18
N64-16110	S-13
N64-16322	S-4
N64-16325	S-3
N64-16328	S-3
N64-16330	S-4
N64-16692	S-21
N64-16704	S-18
N64-16705	S-10
N64-16710	S-24
N64-16714	S-29
N64-16716	S-55
N64-16717	S-17
N64-16719	S-20
N64-16720	S-20
N64-16721	S-20
N64-16731	S-1
N64-16742	S-25
N64-16743	S-10
N64-16744	S-55
N64-16745	S-5
N64-16747	S-13
N64-16748	S-22
N64-16749	S-31
N64-16750	S-18
N64-16753	S-32

Number	Page
N64-16754	S-24
N64-16755	S-10
N64-16756	S-49
N64-16757	S-54
N64-16758	S-1
N64-16759	S-24
N64-16761	S-24
N64-16762	S-15
N64-16763	S-49
N64-16764	S-49
N64-16765	S-1
N64-16929	S-56
N64-17153	S-22
N64-17154	S-13
N64-17155	S-21
N64-17156	S-28
N64-17157	S-2
N64-17158	S-34
N64-17159	S-34
N64-17160	S-34
N64-17161	S-33
N64-17163	S-16
N64-17294	S-16
N64-17295	S-43
N64-17296	S-10
N64-17518	S-1
N64-17721	S-21
N64-17723	S-20
N64-17724	S-31
N64-17725	S-12
N64-17726	S-12
N64-17727	S-32
N64-17728	S-52
N64-17729	S-12
N64-17734	S-20
N64-17749	S-56
N64-17751	S-28
N64-17752	S-24
N64-17753	S-12
N64-17771	S-56
N64-17772	S-11
N64-17773	S-20
N64-17813	S-34
N64-17826	S-1
N64-17827	S-33
N64-17828	S-1
N64-17829	S-33
N64-17831	S-11
N64-17832	S-12
NAA-SR-MEMO-7789	S-47
NAA-SR-7938	S-47
NAA-SR-8610	S-47
NAA-SR-8702	S-47
NASA-CR-21	S-1
NASA-CR-27	S-56
NASA-CR-29	S-11
NASA-CR-35	S-21
NASA-CR-53059	S-33
NASA-CR-53064	S-1
NASA-CR-53077	S-18
NASA-CR-53080	S-32
NASA-CR-53083	S-18
NASA-CR-53084	S-31
NASA-CR-53089	S-1
NASA-CR-53099	S-25
NASA-CR-53103	S-55
NASA-CR-53105	S-10
NASA-CR-53106	S-5
NASA-CR-53108	S-13
NASA-CR-53109	S-22
NASA-CR-53110	S-24
NASA-CR-53111	S-15
NASA-CR-53112	S-49
NASA-CR-53113	S-49
NASA-CR-53115	S-24
NASA-CR-53117	S-1
NASA-CR-53118	S-54
NASA-CR-53119	S-49
NASA-CR-53120	S-10
NASA-CR-53121	S-24
NASA-CR-55161	S-30
NASA-CR-55223	S-18
NASA-CR-55423	S-3
NASA-CR-55509	S-13
NASA-CR-55517	S-3
NASA-CR-55518	S-56
NASA-CR-55562	S-4
NASA-CR-55756	S-4
NASA-CR-55829	S-55
NASA-CR-55832	S-24
NASA-CR-55841	S-29
NASA-CR-55843	S-20
NASA-CR-55851	S-20

Number	Page
NASA-CR-55853	S-20
NASA-CR-55900	S-18
NASA-CR-55901	S-10
NASA-Order-R-38	S-4
NASA-Order-R-47	S-4
NASA-Order-R-99	S-3
NASA-SP-32, v. 1	S-21
NASA-SP-32, v. 2	S-21
NASA-SP-32, v. 3	S-21
NASA-TM-X-949	S-21
NASA-TM-X-952	S-12
NASA-TN-D-1989	S-22
NASA-TN-D-2098	S-54
NASA-TN-D-2116	S-56
NASA-TN-D-2119	S-16
NASA-TN-D-2122	S-43
NASA-TN-D-2130	S-20
NASA-TN-D-2132	S-13
NASA-TN-D-2135	S-20
NASA-TN-D-2141	S-31
NASA-TN-D-2144	S-21
NASA-TN-D-2167	S-28
NASA-TN-D-2177	S-2
NASA-TN-D-2179	S-12
NASA-TN-D-2182	S-34
NASA-TN-D-2190	S-34
NASA-TN-D-2193	S-34
NASA-TN-D-2200	S-11
NASA-TN-D-2221	S-34
NASA-TN-D-2230	S-33
NASA-TN-D-2231	S-12
NASA-TN-D-2238	S-20
NASA-TN-D-2246	S-56
NASA-TN-D-2248	S-1
NASA-TN-D-2256	S-28
NASA-TN-D-2257	S-32
NASA-TN-D-2258	S-10
NASA-TN-D-2260	S-33
NASA-TN-D-2261	S-24
NASA-TN-D-2264	S-52
NASA-TN-D-2265	S-12
NASA-TN-D-2271	S-12
NASA-TR-R-173	S-1
NASA-TR-R-176	S-1
NASA-TR-R-192	S-16
NASA-TR-R-193	S-33
NAS-NRC-1144	S-19
NAS-NRC-1148	S-58
NAS-NRC-1181	S-4
NAVWEPS-1717	S-10
NCEL-R-269	S-17
NEL-1177	S-17
NMI-7009	S-49
NMI-TJ-54	S-38
NOLTR-63-108	S-55
NOLTR-63-133	S-23
NOLTR-63-159	S-22
NOLTR-63-213	S-22
NOLTR-63-228	S-31
NRL-5984	S-37
NYO-7987	S-41
NYO-10209	S-49
NYO-10238	S-44
NYO-10239	S-45
NYO-10273	S-44
NYO-10423	S-41
NYO-10429	S-30
NYO-10431	S-45
NYO-10552	S-8
NYO-10691(Pt. 1)	S-53
OCR-RDR-5	S-28
ORA-03106	S-51
ORA-03424-10-T	S-49
ORA-03424-11-T	S-49
ORA-03424-12-T	S-49
ORA-03615-13-T	S-10
ORA-05863-4-T	S-10
ORNL-3468	S-54
ORNL-TM-358	S-9
ORNL-TM-464	S-44
ORNL-TM-483	S-50
ORNL-TM-541	S-13
ORNL-TM-595	S-44
ORNL-TM-598	S-13
ORNL-TM-602	S-25
ORNL-TM-635	S-9
ORNL-TM-643	S-46
OTS SB-525	S-57
PB-161 898 see PB-165 287	S-28
PB-163 540	S-11
PB-163 600	S-24
PB-165 244	S-12
PB-165 255	S-56

Number	Page
PB-165 256	S-17
PB-165 261	S-31
PB-165 262	S-57
PB-165 263	S-57
PB-165 264	S-34
PB-165 265	S-2
PB-165 266	S-2
PB-165 267	S-53
PB-165 269	S-54
PB-165 270 see AD-291 499	S-52
PB-165 272	S-34
PB-165 273	S-51
PB-165 274	S-14
PB-165 275	S-14
PB-165 276	S-33
PB-165 277	S-11
PB-165 280	S-28
PB-165 281	S-3
PB-165 284	S-3
PB-165 285	S-33
PB-165 286	S-2
PB-165 287	S-28
PB-165 288	S-31
PB-165 289	S-31
PB-165 291	S-34
PB-165 292	S-10
PB-165 294	S-15
PB-165 295	S-15
PB-165 296	S-43
PB-165 297	S-43
PB-165 298	S-21
PB-165 299	S-23
PB-165 300	S-52
PB-165 301	S-30
PB-165 302	S-17
PB-165 303	S-20
PB-165 304	S-20
PB-165 305	S-11
PB-165 308	S-12
PB-171 809-5	S-36
PB-181 671	S-36
PIB-619.5	S-17
PIBMRI-691.5-59	S-17
PLASTEC-N-8	S-25
PPAD-461E	S-46
PU-AEL-659	S-34
PUC-1962-78	S-45
QMFCIAF-S-580-6	S-24
RAI-104	S-44
RFP-63	S-48
RFP-325	S-48
RIAL-60-2192	S-28
RIAL-63-2808	S-26
RIAL-63-3346	S-36
RM-3991-NASA	S-1
RTD-TDR-63-4030	S-19
RTD-TDR-63-4034	S-31
RTD-TDR-63-4096, pt.1	S-27
RTD-TDR-63-4120	S-32
RTD-TDR-63-4144	S-16
RTD-TDR-63-4170	S-14
RTD-TDR-63-4187	S-16
RTD-TDR-63-4190	S-15
RTD-TDR-63-4222	S-52
RTD-TDR-63-4263	S-57
SAO-SR-138	S-20
SAO-SR-141	S-20
SAO-SR-142	S-20
SC-4929(RR)	S-13
SC-4972(RR)	S-9
SCDC-2646	S-23
SCDC-2667	S-25
SCDC-2721	S-30
SCDC-2744	S-32
SCDC-3147	S-55
SCDC-3261	S-53
SCDC-3322	S-33
SC-DR-316-63	S-50
SCR-685	S-2
SC-RR-64-70	S-44
SCTM-126-63(72)	S-18
SRI-3927	S-10
SRI-3927	S-18
SRI-4000	S-29
STL-8653-6026-KU-000	S-55
STL-8654-6025-KU-000	S-55
SWRI-3-1237-3	S-23
SWRI-5-1348-7-1	S-50
TID-14146	S-47
TID-15508	S-5
TID-15751	S-25
TID-15763	S-29
TID-15807	S-7

Number	Page
TID-15842	S-7
TID-15843	S-30
TID-16090	S-3
TID-16186	S-45
TID-16258	S-11
TID-16307	S-30
TID-16340	S-54
TID-16351	S-55
TID-16387	S-9
TID-16463	S-44
TID-16475	S-37
TID-16476	S-50
TID-16485	S-48
TID-16506	S-39
TID-16522	S-43
TID-16526	S-56
TID-16555	S-32
TID-16580	S-23
TID-16595	S-7
TID-16744	S-8
TID-17368	S-47
TID-17718	S-56
TID-17884	S-4
TID-18990	S-3
TID-19046	S-44
TID-19047	S-46
TID-19049	S-6
TID-19071	S-53
TID-19072	S-45
TID-19085	S-41
TID-19111	S-46
TID-19112	S-47
TID-19123	S-53
TID-19126	S-23
TID-19137	S-52
TID-19145	S-40
TID-19155	S-25
TID-19156	S-25
TID-19157	S-25
TID-19160	S-25
TID-19229	S-9
TID-19235	S-13
TID-19240	S-3
TID-19248	S-1
TID-19250	S-2
TID-19255 (Pt. II)	S-3
TID-19265	S-7
TID-19297	S-46
TID-20306	S-1
TII-01-63-27	S-18
TM-63-2-8	S-7
TM-63-6-3	S-35
TM-63-6-700	S-48
TWCC-ER-222-D	S-19
UAC-6111	S-5
UAC-6222	S-29
UAC-6384	S-7
UAC-6385	S-30
UAC-6441	S-45
UAC-6498	S-7
UARI-RR-12	S-13
UCLA-DE-54-71	S-52
UCRL-6926	S-42
UCRL-6953	S-8
UCRL-6967	S-42
UCRL-6990-T	S-43
UCRL-6994	S-42
UCRL-7072	S-24
UCRL-7171	S-19
UCRL-7224(Rev.II)	S-22
UCRL-7430	S-27
UCRL-7554	S-57
UCRL-7559	S-36
UCRL-7616	S-42
UCRL-7618	S-8
UCRL-7651	S-40
UCRL-7657	S-13
UCRL-10178	S-2
UCRL-10210	S-42
UCRL-10215	S-6
UCRL-10332	S-7
UCRL-10336	S-42
UCRL-10344	S-7
UCRL-10403	S-8
UCRL-11124	S-8
UCRL-11132	S-42
UCRL-11150	S-42
UCRL-11160	S-38
UCRL-11191	S-5
UCRL-11193	S-42
UCRL-11220	S-55
UCRL-13042(Rev.)	S-33
UCRL-PUB-48	S-42

Number	Page
UNC-5061	S-50
UNM-PR-49	S-18
WADC-TR-58-360, pt. 5	S-27
WADC-TR-59-170	S-12
WADD-TR-60-241	S-12
WADD-TR-61-67, v.1, rev. 1	S-18
WADD-TR-61-67, v. 1 superseded	S-18
WADD-TR-61-72, v.20	S-28
WAPD-T-1377	S-40
WAPT-T-1431	S-35
WAPD-T-1433	S-35
WAPD-T-1482	S-11
WAPD-T-1506	S-40
WAPD-T-1524	S-40
WAPD-T-1570	S-47
WCAP-3711	S-50
WHOI-Ref. 63-43	S-10
WNZ-61-10-1	S-47
WT-365	S-23
WT-543	S-43
WT-544	S-43
WT-1125	S-21
WVT-RR-6315	S-26

SUBJECT INDEX

Subject	Page	Number
Absorption (Physical)	S-24	PB-163 600
Acceleration tolerance	S-1	NASA-CR-21
Accelerometers	S-18	SCTM-126-63(72)
	S-33	CONF-152-1
Acetylenes	S-41	NYO-7987
Actinide series compounds	S-8	LADC-5128
Adaptive control systems	S-22	N64-16748
Aerodynamic characteristics	S-34	PB-165 291
Algae	S-2	TID-19250
	S-3	N64-16325
Alkali metals	S-55	CONF-166-9
Alkaline cells	S-14	AD-421 049
	S-16	AD-427 070
		AD-429 135
	S-17	N64-16717
Alkynes	S-10	AD-419 686
Alloys	S-36	LADC-5380
Aluminum	S-38	UCRL-11160
	S-55	AD-427 081
Aluminum alloys	S-36	PB-171 809-5
Ammunition fragments	S-20	PB-165 304
Amplifiers	S-46	CONF-58-4
Anesthesia	S-4	NAS-NRC-1181
Annealing	S-39	TID-16506
Annihilation reactions	S-42	CONF-20-4
Antarctic regions	S-11	PB-163 540
Anthropometry	S-57	OTS SB-525
Anti-reversal devices	S-16	AD-427 070
Antiferromagnetism	S-52	AD-291 499
Antimonous oxide	S-28	PB-165 287
Antineutrinos	S-42	UCRL-10336
Applied mechanics	S-19	UCRL-7171
Arithmetic operations	S-31	AD-427 355
Armed forces procurement	S-27	AD-424 853
Armor plates	S-37	AD-421 029
Army reactors	S-46	LADC-5359
	S-47	IDO-28584(Add.1)
Astronomical data	S-1	N64-16758
Atlantic Ocean	S-11	PB-165 277
Atmosphere entry	S-52	AD-428 310
Atmospheric temperature	S-10	N64-16755
Atomic orbitals	S-41	NYO-10423
Ausforming	S-37	AD-425 948
Austenite	S-37	AD-425 948
Autoignition	S-28	NASA-TN-D-2167
Aviation medicine	S-4	N64-16330
Bacteria	S-3	N64-16325
Bacteriophages	S-5	BNL-6202
Ball mills	S-28	PB-165 280
Band-pass filters	S-15	PB-165 294
		PB-165 295
Barium compounds	S-8	UCRL-11124
Barnacles	S-2	PB-165 286
Batteries and components	S-14	AD-421 049
	S-15	N64-16762
	S-16	AD-429 135
	S-17	N64-16717
Battery separators	S-14	AD-421 049
Beryllium	S-27	UCRL-7430
	S-35	AD-425 604
	S-38	NMI-TJ-54
Beryllium alloys	S-35	BBC-119
Bessel functions	S-31	AD-423 898
		PB-165 289
Bibliographies	S-2	PB-165 265
	S-3	TID-18990
	S-35	IS-513
	S-36	UCRL-7559
	S-57	OTS SB-525
Big Rock Point power reactor	S-48	GEAP-4155
Biophysics	S-2	UCRL-10178
	S-3	PB-165 284
Biosynthesis	S-4	N64-16322
Biphenyl	S-7	CONF-76-5
Bismuth	S-7	HW-SA-2632
Blood	S-4	AD-423 383
Blunt bodies	S-34	NASA-TN-D-2182
Bombardment induced conductivity	S-16	AD-421 054
Bone marrow	S-5	CONF-29-1
Booster rockets	S-24	N64-16754
		N64-16759
		N64-16761
	S-25	N64-16742
Borides	S-27	AD-428 006
	S-36	UCRL-7559
Boron	S-40	WAPD-T-1377
Boundary layer	S-33	PB-165 285
Brachiopods	S-2	PB-165 286
Brain	S-3	TID-19240
Bransfield Strait	S-11	PB-165 277
Brazing	S-36	CONF-94-5
Building materials	S-11	TID-16258
Cadmium	S-17	N64-16717
Calcination	S-44	ORNL-TM-595
Calcium	S-3	TID-18990
	S-44	RAI-104
	S-55	CONF-50-14
Californium	S-40	CONF-46-44
Calorimeters	S-46	TID-19297
Cape Thompson	S-6	HW-SA-2509
Carbohydrates	S-4	HW-SA-2588
Carbon	S-27	AD-427 104
	S-44	CONF-13-7
Carboranes	S-10	AD-419 686
Carolinas Virginia tube reactor	S-50	CVNA-147
Carotenoids	S-42	UCRL-10210
Catalogs	S-20	N64-16719
Cavitation	S-49	N64-16756
		N64-16763
		N64-16764
Celestial navigation	S-22	AD-294 927
Ceramic materials	S-15	PB-165 294
		PB-165 295
	S-26	AD-422 242
	S-27	AD-424 853
Cerium	S-36	LADC-5428
Cermets	S-26	AD-422 242
Cesium	S-41	HW-SA-2982
	S-44	RAI-104
Charcoal	S-24	PB-163 600
Chelate compounds	S-1	TID-19248
Chemical engineering	S-32	IS-698
Chemical radiation detectors	S-46	TID-19297
Chlorophylls	S-11	PB-165 277
	S-42	UCRL-10210
Chromium alloys	S-39	AD-425 922
Cigarettes	S-3	PB-165 281
Circuits	S-17	AD-425 122
	S-18	SCTM-126-63(72)
Civil defense systems	S-23	TID-19126
Cleaning compounds	S-9	AD-423 556
Clevite-17	S-15	PB-165 295
Co-20Cr-15W-10Ni alloys	S-39	AD-425 922
Coal	S-13	CONF-124-1
	S-28	PB-165 280
Coatings	S-54	N64-16757
Coaxial cables	S-19	AD-423 688
Cobalt	S-35	AD-425 604
Cobalt alloys	S-36	PB-171 809-5
	S-39	AD-425 922
	S-55	LADC-5363
Colorimetry	S-10	NASA-TN-D-2258
Combustion products	S-23	AD-424 860
Communication satellites	S-21	NASA-SP-32, v. 1
		NASA-SP-32, v. 2
		NASA-SP-32, v. 3
Complex compounds	S-8	NYO-10552
Composite materials	S-26	AD-422 242
		AD-426 365
Computer logic	S-17	AD-425 122
Computer systems components	S-17	AD-425 122
Computers	S-31	AD-427 355
Condensation	S-13	TID-19235
Conferences	S-4	NAS-NRC-1181
	S-51	AD-420 450
Conformal mapping	S-13	N64-16110
Continued fractions	S-31	AD-423 898
Control rods	S-47	TID-17368
	S-50	WCAP-3711
Control systems	S-24	N64-16759
		N64-16761
	S-35	N64-16742
Convection	S-56	NASA-TN-D-2116
Convex sets	S-31	PB-165 261
Conveyors	S-28	PB-165 280
Coolants	S-25	AD-421 973
Copper	S-32	AD-427 919
	S-39	TID-16506
	S-55	AD 427 081
Corrosion	S-39	AD-425 474
	S-40	MSAR-63-117
Cosmic rays	S-44	NYO-10273
	S-46	TID-19111
Counting methods	S-42	UCRL-10210
Cratering	S-23	CONF-84-2
Critical assemblies	S-48	CONF-39-48
	S-49	CONF-133-1
		LADC-5383
Criticality studies	S-48	RFP-63
		RFP-325
	S-49	CONF-133-1
Crucibles	S-48	RFP-63
Crustacea	S-2	PB-165 286
Cryogenics	S-36	PB-171 809-5
		PB-181 671
Crystal filters	S-15	PB-165 294
		PB-165 295
Crystal growth	S-26	AD-426 365
Crystal lattice defects	S-38	UCRL-11160
	S-54	PB-165 269
		TID-16340
	S-56	TID-16526
Crystal structure	S-55	LADC-5363
		LADC-5373
Crystals	S-7	HW-SA-2645
	S-9	TID-19229
	S-38	NMI-TJ-54
	S-54	AD-296 277
		TID-16340
	S-55	CONF-50-14
		CONF-166-9
Cyclotrons	S-46	ORNL-TM-643
Data processing systems	S-10	N64-16705
De-icing systems	S-12	PB-165 308
Decaboranes	S-10	AD-419 686
Decompression sickness	S-4	NAS-NRC-1181
Deformation	S-39	TID-16506
	S-40	TID-19145
Delay elements (Explosives)	S-22	AD-423 675
Dendrites	S-19	AD-429 136
Detectors	S-46	TID-19047
Deuterium	S-41	NYO-7987
	S-53	TID-19123
Deuterons	S-44	TID-16463
	S-45	PUC-1962-78
11, 12-Dicarba dodecaborane-12	S-10	AD-419 686
Differential cross sections	S-42	UCRL-11150
Differential equations	S-30	PB-165 301
Diffraction gratings	S-54	ORNL-3468
Diodes	S-17	PB-165 302
Diodes (Semiconductors)	S-54	AD-296 277
Disasters	S-46	HW-73891(Rev.)
Dispersion hardening	S-39	AD-427 343
Dissolution	S-9	TID-16387
	S-13	ORNL-TM 598
Dissolvers	S-13	ORNL-TM-598
Diving	S-4	NAS-NRC-1181
Documentation	S-57	AD-428 423
		PB-165 262
		PB-165 263
		UCRL-7554
	S-58	NAS-NRC-1148
Dosimeters	S-47	TID-19112
Drake Passage	S-11	PB-165 277
Dynamics	S-30	PB-165 301
Dysprosium	S-8	TID-16744
Ear	S-3	N64-16328
Ecology	S-3	N64-16325
Education	S-32	AD-419 160
Elastic scattering	S-42	UCRL-11150
	S-51	AD-426 561
Elasticity	S-33	NASA-TN-D-2260
Elastomers	S-26	AD-422 028
Electric arcs	S-13	NASA-TN-D-2132
	S-51	AD-420 450
Electric currents	S-18	N64-16750
Electric discharges	S-53	PB-165 267

Subject	Page	Number
Electric power production	S-19	AD-427 297
Electrical conductance	S-53	MATT-130
Electrical networks	S-52	PB-165 300
Electrochemistry	S-9	CONF-20-22
	S-18	AD-433 506
Electrodeposition	S-7	HW-SA-2645
	S-36	AD-424 466
Electrolytes	S-13	N64-16747
Electromagnetic pumps	S-16	LADC-5418
Electromagnets	S-14	AD-426 776
Electron beams	S-13	AD-425 878
	S-42	UCRL-6967
Electron bombardment	S-16	AD-421 054
Electron transitions	S-53	AD-423 323
Electron tube parts	S-15	AD-425 878
Electron tubes	S-15	AD-425 878
Electronic equipment	S-18	N64-16704
Electrons	S-42	UCRL-10336
	S-52	AD-291 499
		TID-19137
	S-54	PB-165 269
Electroretinogram	S-3	TID-19255 (Pt. II)
Electrostatic fields	S-41	IS-475
Elementary particles	S-45	EFINS-62-17
		NYO-10239
		NYO-10431
		TID-19072
Elk river power	S-50	SWRI-5-1348-7-1
Emissivity	S-24	N64-16710
Emitter followers	S-18	SCTM-126-63(72)
Energy conversion	S-19	AD-429 136
Engineering thesaurus	S-57	PB-165 262
		PB-165 263
Enzymes	S-3	PB-165 281
	S-6	TID-19049
Ephemeris	S-1	N64-16758
Epoxy plastics	S-28	PB-165 287
Equations of state	S-55	AD-427 081
Eratosthenes	S-30	N64-13190
Erbium	S-8	TID-16744
Erythrocytes	S-4	HW-SA-2588
Ethanes	S-41	NYO-7987
Europium	S-7	CONF-20-18
Exhaust gases	S-24	N64-16710
Exhaust nozzles	S-13	NASA-TN-D-2132
Expanded plastics	S-4	AD-423 386
	S-5	AD-422 666
	S-29	AD-426 294
Exploding wires	S-22	AD-424 518
Explorer XVI	S-21	NASA-TM-X-949
Explosion effects	S-20	PB-165 304
	S-21	PB-165 298
	S-23	PB-165 299
Explosive actuators	S-22	AD-423 675
Explosive initiators	S-22	AD-424 518
	S-23	AD-426 466
Explosive materials	S-10	PB-165 292
Extraterrestrial topography	S-1	N64-16765
Eye	S-3	TID-19255(Pt. II)
Fast neutrons	S-40	WAPD-T-1377
	S-43	LA-2235
	S-44	CONF-13-7
	S-46	LADC-5359
		TID-19047
Fast reactors	S-48	CONF-39-45
Fastenings	S-12	PB-165 244
Fatigue (Mechanics)	S-11	TID-16258
	S-29	AD-424 863
	S-50	SWRI-5-1348-7-1
Fats	S-3	PB-165 281
Fatty acids	S-9	AD-423 556
Ferromagnetic materials	S-52	AD-291 499
FFAG accelerators	S-46	CONF-125-4
		CONF-125-5
Fibers	S-29	AD-424 861
		AD-424 863
Field theory	S-52	AD-291 499
	S-54	PB-165 269
Filament wound construction	S-25	AD-425 147
Fire safety	S-23	AD-424 860
Fission	S-42	UCRL-11193
Fission products	S-40	CONF-46-44
	S-48	CONF-39-64
	S-49	CONF-39-59
	S-50	GEAP-4278
Fittings	S-12	PB-165 244
Fixed-point gamut	S-31	AD-427 355
Fluid flow	S-32	TID-16555
	S-33	PB-165 276
		PB-165 285
Fluorescence	S-7	CONF-76-5
Fluorides	S-8	UCRL-11124
	S-55	CONF 50-14
Foils	S-40	LADC-5851
	S-54	ORNL-3468
Fracture (Mechanics)	S-33	NASA-TN-D-2260
Free radicals	S-4	HW-SA-2588
	S-8	UCRL-10403
Frequency multipliers	S-18	N64-16107
Fuel cells	S-13	N64-16747
Fuel consumption	S-20	PB-165 303
Fuel tanks	S-22	NASA-TN-D-1989
Functional analysis	S-31	PB-165 288
		PB-165 289
Fuzes (Ordnance)	S-23	AD-426 466
Gamma rays	S-35	CONF-39-35
	S-50	CONF-39-44
Gas-cooled reactors	S-47	CONF-39-33
		IDO-28584(Add.1)
Gas discharges	S-51	AD-420 450
Gas flow	S-13	NASA-TN-D-2132
	S-33	N64-15790
	S-34	PB-165 264
	S-56	TID-17718
Gas-generating systems	S-29	N64-16714
Gas masks	S-23	LADC-5410
Gases	S 29	N64-16714
	S-34	NASA-TN-D-2221
	S-53	NYO-1069(Pt. 1)
Gears	S-28	AD-297 773
Generators	S-14	AD-426 776
	S-52	AD-428 310
Genetics	S-6	LADC-5401
Geogony	S-1	N64-16731
Geophysics	S-11	PB-163 540
Germanium	S-17	PB-165 256
Gold	S-54	ORNL-3468
Grain structures (Metallurgy)	S-38	AD-423 952
Graphite	S-27	AD-427 104
	S-28	AD-426 185
	S-33	UCRL-13042(Rev.)
Graphited materials	S-28	PB-165 287
Grinders	S-28	PB-165 280
Group V elements	S-9	CONF-20-5
Growth substances	S-2	TID 19250
Hafnium	S-35	WAPD-T-1431
		WAPD-T-1433
Hafnium alloys	S-38	AD-426 255
	S-39	AD-427 343
Hafnium diboride	S-27	AD-428 006
Halides	S-55	CONF-166-9
Handbooks	S-18	AD-421 951
	S-36	PB-171 809-5
		PB-181 671
	S-46	ORNL-TM-643
Hardness	S-35	WAPD-T-1433
Haynes alloys no. 25	S-39	AD-425 922
Health physics	S-6	CONF-66-6
		HW-SA-2653
Hearing	S-3	PB-165 284
Heat exchangers	S-25	ORNL-TM-602
		TID-19155
	S-56	NASA-TN-D-2116
Heat-resistant metals and alloys	S-35	CONF-94-4
	S-36	CONF-94-5
		UCRL-7559
Heat transfer	S-16	NASA-TN-D-2119
	S-25	AD-421 973
	S-47	EURAEC-612
	S-51	AD-420 450
		PB-165 273
	S-56	AGN-8088
		GEAP-4258
		N64-16106
		TID-17718
Heat transfer coefficients	S-56	NASA-TN-D-2116
Heaters	S-13	NASA-TN-D-2132
Heating plants	S-19	NAS-NRC-1144
Heavy water	S-5	HW-SA-2570
Heavy water reactors	S-49	MITNE-35
Heisenberg uncertainty principle	S-52	AD-425 844
Helicopter rotors	S-12	PB-165 244
		PB-165 308
	S-34	PB-165 291
Helicopters	S-11	PB-165 305
Helium	S-8	LADC-5411
	S-9	TID-19229
	S-44	TID-16463
	S-52	TID-19137
Hemopoietic system	S-5	CONF-29-1
Heptanes	S-41	TID-19085
Histamine	S-6	TID-19049
Histology	S-3	N64-16328
Holmium	S-8	TID-16744
HU-1	S-11	PB-165 305
Human engineering	S-1	NASA-CR-21
	S-2	NASA-TN-D-2177
Hydrogen	S-7	TID-19265
	S-41	NYO-7987
	S-50	TID-16476
Hydroxides	S-7	CONF-20-18
Hymenoptera	S-6	HW-SA-2605
Hyperfragments	S-41	EFINS-63-32
		EFINS-63-39
Hypersns	S-41	EFINS-63-32
		EFINS-63-39
	S-45	BNL-7105
		EFINS-63-29
Hypersonic flow	S-34	NASA-TN-D-2182
Hypoxia	S-4	NAS-NRC-1181
Ignition	S-22	LADC-5776
Ignition systems	S-17	AD-425 361
Immunity	S-6	UCRL-10215
Industrial hygiene	S-23	CONF-84-2
Information retrieval	S-57	AD-428 423
		PB-165 262
		PB-165 263
	S-58	NAS-NRC-1148
Infrared radiation	S-10	N64-16705
		N64-16755
Infrared spectroscopy	S-7	TID-15842
Input-output devices	S-32	N64-16753
Instruction manuals	S-44	IDO-14613
Integral equations	S-41	GA-3298
	S-43	UCRL-6990-T
Integral transforms	S-30	PB-165 301
	S-52	PB-165 300
International Geophysical Year	S-11	PB-163 540
Interplanetary trajectories trajectories	S-31	N64-16749
Iodine	S-6	LADC-5209
Ion exchange	S-7	TID-16595
	S-8	LADC-5377
Ionization chambers	S-46	TID-19297
Ionosphere	S-11	PB-164 540
Ions	S-8	LADC-5377
	S-52	TID-19137
Iron	S-1	TID-19248
	S-37	BNL-6249
Iron alloys	S-37	BNL-6249
Irradiated foods	S-24	PB-163 600
Isocyanate plastics	S-4	AD-423 386
	S-5	AD-422 666
	S-26	AD-422 028
	S-29	AD-426 294
Isotope effects	S-7	BNL-6279
Isotopes	S-5	HW-SA-2613
	S-6	HW-SA-2626
		UCRL-10215
	S-40	CONF-46-44
		WAPD-T-1506
	S-42	UCRL-6926
	S-43	LA-2235
	S-44	CONF-13-7
		TID-16463
	S-46	LADC-5359
		TID-19047
Jangle operation	S-21	PB-165 298
	S-23	PB-165 299
Jets	S-13	TID-19235
Kaons	S-45	BNL-7105
		EFINS-62-5(Rev)
Laminar boundary layer	S-34	PB-165 272
Laminar flow	S-32	TID-16555
	S-34	PB-165 264
		PB-165 272
Lasers	S-55	N64-16744
Launch vehicles (Aerospace)	S-34	NASA-TN-D-2190
Lead	S-53	TID-19071
Leukemia	S-6	UCRL-10215
Light	S-53	AD-421 838
	S-54	N64-16757
Light water reactors	S-47	EURAEC-612
Linerar accelerators	S-46	CONF-125-3
Linear programming	S-24	N64-16759
Liquefied gases	S-8	LADC-5411
Liquid metals	S-49	N64-16764
Liquids	S-8	UCRL-10403
Lithium	S-43	LA-2235

Subject	Page	Number
Litter beds	S-4	AD-423 386
Low-temperature alloys	S-36	PB-171 809-5
		PB-181 671
Lubricants	S-28	AD-297 773
		PB-165 287
Luminescence	S-53	NYO-10691(Pt. 1)
Machine tools	S-24	UCRL-7072
Machining	S-24	UCRL-7072
Magnesium	S 44	RAI-104
	S-55	AD-427 081
Magnet coils	S-16	LADC-5418
Magnetic fileds	S-53	MATT-135
		PB 165 267
Magnetohydrodynamics	S-14	AD-426 776
	S-19	AD-427 297
Magnetoresistance	S-18	N64-16750
Magnets	S-46	CONF-125-5
Mammals	S-6	LADC-5209
Manufacturing methods	S-25	AD-425 147
Marine biology	S-11	PB-165 277
Marine meteorology	S-10	AD-426 772
	S-11	PB-165 277
Maritime reactors	S-48	CONF-39-48
Mars	S-1	N64-16758
		N64-16765
Masers	S-55	N64 16744
Material forming	S-38	AD-423 952
	S-39	AD-425 474
Materials	S-26	CONF-112-3
Mathematical prediction	S-20	PB 165 304
Matrix algebra	S-30	NYO-10429
Measuring devices (Electrical and electronics)	S-13	AD-429 924
Mechanical engineering	S-19	UCRL-7171
Mechanical properties	S-36	LADC-5330
	S-38	NMI-TJ-54
Mechanics	S-21	NASA-TN-D-2144
Medical equipment	S-4	AD-423 386
Medical supplies	S-5	AD-422 666
Memory devices	S-46	PPAD-461E
Mercuric chloride	S-2	PB-165 286
Mercury	S-49	N64-16763
		N64-16764
	S-53	PB-165 267
Meshless storage tubes	S-16	AD 421 054
Mesons	S-44	NYO-10238
	S-45	BNL-7105
		CONF-46-80
	S-45	EFINS-62-5(Rev.)
	S-46	CONF-125-4
Metabolism	S-3	PB-165 281
		TID-18990
	S-6	LADC-5209
		TID-19049
Metal coatings	S-36	AD-424 466
Metal films	S-18	AD-433 506
Metal plates	S-37	AD-421 029
Metallic crystals	S-55	AD-427 081
Metallic textiles	S-26	AD-422 242
Metallography	S-37	TID-16475
Metallurgy	S-58	NAS-NRC-1148
Metals	S-40	TID-19145
Meteorological parameters	S-10	AD-426 772
Meteorological phenomena	S-11	PB-163 540
Meteorological satellites	S-10	N64-16705
Meteors	S-22	NASA-TN-D-1989
Meters	S-24	UCRL-7072
Methyl radicals	S-41	TID-19085
Mice	S-5	TID-15508
	S-6	LADC 5278
Micrometeoroids	S-21	NASA-TM X-949
Microminiaturization (Electronics)	S-17	AD-425 122
Microwave equipment	S-17	PB-165 256
Microwaves	S-54	AD-296 277
Miniature electronic equipment	S-15	PB-165 294
Mixers (Electronic)	S-18	N64-16704
Mk 14 Delay actuators	S-22	AD-423 675
Modulators	S-17	PB-165 256
	S-53	AD-421 838
Moistureproofing	S-19	AD-423 688
Molecular structure	S-8	NYO-10552
Molecules	S-41	NYO-10423
Molybdenum	S-35	AD-425 604
		CONF-39-43
	S-37	AD-421 905
	S-38	AD-423 952
		AD-426 264
Molybdenum alloys	S-38	AD-426 255
	S-39	AD-425 549
Molybdenum disilicide	S-26	AD-421 084
Molybdenum disulfide	S-28	PB-165 287
Momentum	S-32	AD-425 844
Monte Carlo method	S-43	NASA-TN-D-2122
Motion sickness	S-4	N64-16330
Movable rocket motors	S-24	N64 16754
Multiaxial loading	S-32	AD-427 919
Mutations	S-5	UCRL-11191
	S-6	LADC 5278
Naphthalene-1, 3, 6-sulfonic acid	S-36	AD-424 466
Naphthalenes	S-7	CONF-76-5
Naval procurement	S-17	AD-425 122
Neutrinos	S-42	UCRL-10336
Neutron absorption	S-40	WAPD-T-1377
		WAPD-T-1506
Neutron cross sections	S-40	WAPD-T-1524
	S-42	UCRL-6926
	S-47	NAA-SR-MEMO-7789
Neutron embrittlement	S-37	AD-423 526
Neutron flux	S-48	TID-16485
Neutron reactions	S-37	AD-423 526
	S-43	LA-2235
	S-44	CONF-13-7
	S-46	TID-19047
Neutron spectrum	S-44	CONF-11-5
Neutrons	S-41	CONF-39-46
	S-46	HW-73891(Rev.)
	S-48	TID-16485
	S-49	LADC-5383
Nickel	S-17	N64-16717
	S-35	AD-425 604
	S-36	AD-424 466
Nickel alloys	S-36	PB-171 809-5
	S-39	AD-425 922
Nickel compounds	S-9	ORNL-TM-635
Niobium	S-18	AD-433 506
	S-35	AD-425 604
	S-36	CONF-94-5
	S-37	AD-421 905
	S-38	AD-423 952
		AD-426 255
Niobium alloys	S-36	CONF-94-5
	S-38	AD-426 264
	S-39	AD-425 547
		AD-427 343
Niobium diboride	S-27	AD-428 006
Nitrates	S-7	TID-15842
	S-9	ORNL-TM-358
	S-48	RFP-325
Nitric acid	S-9	ORNL-TM-358
		TID-16887
Nitrides	S-36	UCRL-7559
Nitroform	S-10	PB-165 292
Nitrogen	S-7	BNL-6279
		HW-SA-2663
Nitrogen compounds	S-10	PB-165 292
Non-destructive testing	S-26	CONF-112-3
Nuclear cross sections	S-51	AD-426 561
Nuclear electric moments	S-41	IS-475
Nuclear explosions	S-22	UCRL-7224(Rev.I)
	S-23	CONF-84-2
	S-43	PB-165 296
		PB-165 297
Nuclear industrial applications	S-13	CONF-124-1
Nuclear physics	S-41	EFINS-63-32
	S-42	UCRL-11132
Nuclear radiation spectrometers	S-45	TID-16186
Nuclear reactions	S-51	CONF-52-3
Nuclear theory	S-43	CONF-128-1
Nuclei	S-43	CONF-128-1
Nucleic acids	S-4	TID-17884
Nucleons	S-41	EFINS-63-39
	S-44	NYO-10238
	S-45	CONF-46-80
Number theory	S-30	N64-13190
	S-31	AD-427 355
Numerical analysis	S-30	TID-14843
Nutrition	S-3	PB-165 281
Nystagmus	S-4	N64-16330
Oils	S-28	AD-297 773
Omndirectional antennas	S-17	AD-425 361
Operators (Mathematics)	S-31	PB-165 288
Orbital trajectories	S-20	N64-16719
		N64-16720
		N64-16721
Organic compounds	S-8	UCRL-7618
Organoboranes	S-10	AD-419 686
ORNL relativistic isochronous cyclotron	S-46	ORNL-TM-643
Oxidation	S-9	SC-4972(RR)
Oxides	S-7	BNL-6279
		CONF-2 118
		HW-SA-2645
		HW-SA-2663
	S-8	TID-16744
	S-9	TID-19229
	S-27	UCRL-7430
	S-40	WAPD-T-1506
	S-48	CONF-39-64
	S-49	CONF-39-59
Oxygen	S-8	UCRL-7618
	S-44	CONF-13-7
	S-47	IDO-28584(Add. 1)
Packing materials	S-29	AD-426 294
Paramagnetic resonance	S-2	UCRL-10178
Particle tracks	S-46	PPAD-461E
Pentachloro phenol	S-26	AD-422 028
Pentanes	S-41	TID-19085
Permanganates	S-7	TID-15807
Perturbation theory	S-45	TID-19072
Pesticides	S-2	PB-165 286
PETN	S-22	LADC-5776
Phase studies	S-36	LADC-5428
Phenanthrenes	S-7	CONF-76-5
Phenolic plastics	S-28	PB-165 287
Phonons	S-54	PB-165 269
	S-55	N64 16744
Phosphorus	S-46	LADC-5359
Phosphorus compounds	S-7	TID-15842
Photochemistry	S-10	NASA-TN-D-2258
Photographic techniques	S-17	PB-165 302
Photoresist technique	S-17	PB-165 302
Photosynthesis	S-2	TID-19250
		UCRL-10178
Piezoelectric crystals	S-15	PB-165 294
		PB-165 295
	S-53	TID-19071
Pilots	S-2	NASA-TN-D-2177
Pions	S-44	NYO-1-238
	S-45	EFINS-62-5(Rev.)
	S-46	CONF-125-4
Pipes	S-19	NAS-NRC-1144
	S-32	AD-427 919
Pistons	S-33	N64-15790
Planets	S-1	N64-16731
		N64 16765
Plankton	S-2	TID-19250
	S-11	PB-165 277
Plants (Botany)	S-1	TID-19248
	S-11	PB-165 277
Plasdone-C	S-4	AD-423 383
Plasma generators	S-52	AD 428 310
Plasma jets	S-51	AD-420 450
Plasma physics	S-51	AD-420 450
	S-53	AD-423 323
		MATT-130
		MATT-135
		PB-165 267
Plasma sheath	S-15	AD-426 882
	S-51	AD-420 450
		PB-165 273
	S-52	AD-428 310
Plasticity	S-39	TID-16506
	S-40	TID-19145
Plastics	S-29	TID-15763
	S-30	AD-416 633
Plowshare project	S-6	HW-SA-2509
Plutonium	S-5	HW-SA-2613
	S-6	HW-SA-2626
		HW-SA-2653
	S-8	LADC-5377
	S-9	TID-16387
	S-36	LADC-5330
	S-40	LA-2989
		UCRL-7651
	S 48	RFP-63
		RFP-325
	S-55	LADC-5373
Plutonium alloys	S-55	LADC-5363
Pneumatic systems	S-28	PB-165 280
Polonium	S-7	HW-SA-2632
Polycarbodiimide	S-26	AD-422 028
Polyethylene plastics	S-30	TID-16307
Polysaccharides	S-4	HW-SA-2588
Polyvinyl pyrrolidone	S-4	AD-423 383
Positioning reactions	S-2	NASA-TN-D-2177

Subject	Page	Number
Positrons	S-42	CONF-20-4
Potassium	S-7	TID-15807
Powders	S-28	PB-165 280
Power reactors	S-47	CONF-39-33
	S-48	GNEC-210(Suppl (Suppl. 3)
Power supplies	S-19	AD-427 297
Praseodymium	S-9	CONF-20-5
Preservation	S-4	AD-423 383
Pressure vessels	S-11	WAPD-T-1482
	S-29	N64-16714
	S-37	AD-423 526
	S-47	WAPD-T-1570
	S-48	GNEC-210 (Suppl. 3)
	S-50	SWRI-5-1348-7-1
Primary cells	S-15	N64-16762
Printed circuits	S-18	AD-433 506
Programming (Computers)	S-21	AD-425 499
	S-31	PB-165 261
	S-32	IS-698
		N64-16753
	S-48	EURAEC-702
Projectiles	S-20	PB-165 304
Propellants	S-28	NASA-TN-2167
Propenes	S-7	TID-19265
Proteins	S-3	PB-165 281
Proton accelerators	S-46	CONF-125-3
		CONF-125-4
Proton scattering	S-43	NASA-TN-D-2122
	S-51	AD-426 561
Protons	S-42	UCRL-6967
	S-44	TID-16463
	S-45	BNL-7105
Psychometrics	S-2	PB-165 266
Psychomotor tests	S-2	NASA-TN-D-2177
Puerto Rico power reactor	S-48	GNEC-210 (Suppl. 3)
Purex process	S-13	ORNL-TM-541
Pyrolytic graphite	S-27	AD-427 104
	S-27	AD-426 185
Quality control	S-17	AD-425 122
	S-25	TID-15751
	S-27	AD-424 853
Quantum mechanics	S-30	NYO-10429
	S-41	NYO-10423
	S-43	CONF-128-1
	S-45	NYO-10431
	S-52	AD-291 499
		AD-425 844
	S-54	PB-165 269
Radiation damage	S-5	HW-SA-2613
	S-37	AD-423 526
	S-54	NASA-TN-D-2098
	S-55	N64-16716
Radiation effects	S-5	BNL-6202
		TID-15508
	S-6	HW-SA-2605
		LADC-5278
		LADC-5401
	S-37	BNL-6249
	S-47	WAPD-T-1570
Radiation injuries	S-5	CONF-29-1
Radiation measurement system components	S-46	CONF-58-4
Radiation measurement systems	S-46	TID-19111
Radiation protection	S-6	UCRL-10215
	S-23	CONF-84-2
		TID-19126
Radiation pyrometers	S-43	PB-165 297
Radiators	S-25	ORNL-TM-602
Radioactivation analysis	S-42	UCRL-7616
	S-43	TID-16522
Radioactive fallout	S-6	CONF-66-6
	S-35	CONF-39-35
	S-44	SC-RR-64-70
Radioactive waste	S-41	HW-SA-2982
Rabiobiology	S-6	HW-SA-2509
		LAMS-3034
Radiochemistry	S-44	IDO-14613
Radiofrequency amplifiers	S-17	AD-425 361
Radiofrequency filters	S-15	PB-165 294
		PB-165 295
Radiolysis	S-41	NYO-7987
		TID-19085
Radiometers	S-10	N64-16743
Radiometric analysis	S-42	UCRL-10210
Radium	S-5	HW SA-2613
Rare earths	S-9	CONF-20-22
	S-35	IS-513
Rare earths (con.)	S-41	HW-SA-2982
	S-42	CONF-20-4
Rats	S-3	TID-19255 (Pt. II)
Reactor accidents	S-46	LADC-5359
Reactor control	S-50	CONF-39-44
Reactor coolants	S-47	EURAEC-612
Reactor cores	S-50	CVNA-147
Reactor engineering	S-47	NAA-SR-MEMO-7789
	S-48	EURAEC-702
Reactor fuel cladding	S-50	TID-16476
Reactor fuel elements	S-13	ORNL-TM-541
	S-48	CONF-39-45
		GEAP-4155
	S-50	ORNL-TM 483
Reactor fuel rods	S-48	GEAP-4155
	S-49	MITN-85
Reactor fuels	S-48	CONF-39-45
		GEAP-4277
	S-50	GEAP-4278
Reactor lattice parameters	S-50	WCAP-3711
Reactor materials	S-47	NAA-SR-8702
Reactor materials		TID-14146
Reactor safety systems	S-50	CONF-39-44
Reactor system components	S-47	TID-17368
Reactors	S-41	CONF-39-46
Reflection	S-54	N64-16757
Refractory coatings	S-26	AD-421 084
	S-39	AD-425 474
Refractory materials	S-27	AD-427 104
		AD-428 006
	S-28	AD-426 185
Refractory metals	S-35	AD-425 604
	S-37	AD-421 905
	S-38	AD 423 952
		AD-426 255
		AD-426 264
		AD-426 344
	S-39	AD-425 474
		AD-425 547
Reinforcing materials	S-26	AD-422 242
Rendezvous trajectories	S-21	AD-425 499
Reproduction (Physiology)	S-6	LADC-5278
Research program administration	S-27	AD-424 853
Residue numbers	S-31	AD-427 355
Resistance (Electrical)	S-55	UCRL-11220
Resonance	S-58	TID-19123
Resonators	S-15	PB-165 294
		PB-165 295
Resperine	S-3	TID-19240
Respiration	S-4	NAS-NRC-1181
Respirators	S-23	LADC-5410
Rhenium alloys	S-39	AD-425 547
RIA Compound 9A	S-28	PB-165 287
Rocket motor nozzles	S-39	AD-425 474
Rocket motors	S-24	N64-16710
	S-25	AD-425 147
Rocket trajectories	S-20	PB-165 303
Rolls and links indexing	S-57	AD-428 423
Rotor blades (Rotary wings)	S-12	PB-165 244
		PB-165 307
Saccharin	S-36	AD-424 466
Safety	S-23	AD-424 860
Sampling	S-22	NASA-TN-D-1989
	S-25	TID-15751
Satellites (Artificial)	S-20	N64-16720
		N64-16721
	S-21	NASA-SP 32, v.1
		NASA-SP-32, v.2
		NASA-SP-32, v.3
		NASA-TM-X-949
Scattering	S-42	UCRL-6994
	S-43	UCRL-6990-T
	S-44	NYO-10238
Scientific research	S-42	UCRL-PUB-48
Sea water	S-7	TID-15807
	S-11	PB-165 277
	S-16	AD-421 054
Secondary emission	S-43	NASA-TN-D-2122
Selfadjoint operators	S-31	PB-165 288
Semiconductor devices	S-19	AD-429 136
Semiconductors	S-55	N64-16716
Shelters	S-29	AD-426 294
Shielding	S-44	ORNL-TM-595
Ship plates	S-37	AD-421 029
Shock tubes	S-33	N64-15790
Shock waves	S-34	NASA-TN-D-2182
		NASA-TN-D-2221
		PB-165 272
Silicides	S-26	AD-421 084
Silicon	S-19	AD-429 136
	S-46	TID-19047
Silver	S-14	AD-421 049
	S-55	AD-427 081
Silver oxide	S-14	AD-421 049
Sintering	S-55	CONF-50-14
Sodium	S-40	MSAR-63-117
	S-56	TID-16526
Solar cells	S-16	AD-427 070
	S-18	N64 15963
	S-19	AD-429 136
	S-54	NASA-TN-D 2098
	S-55	N64-16716
Solar panels	S 19	AD-429 136
Solar systems	S-1	N64-16731
Solid rocket propellants	S-28	NASA TN D-2167
Solids	S-36	LADC-5380
Solutions	S-36	LADC-5380
Solvent extraction	S-9	ORNL-TM-358
	S-41	HW-SA-2982
	S-44	ORNL-TM-464
Space biology	S 5	N64-16745
Space environmental conditions	S-21	NASA-TM-X-949
Space medicine	S-3	PB-165 284
Space navigation	S-22	AD-294 927
Spacecraft	S-21	AD-425 499
		NASA-TN-D-2144
	S-22	N64-16748
Spark detectors	S 46	PPAD 461E
Spectral theorem	S 31	PB-165 288
Spin waves	S-52	AD 291 499
	S 54	PB 165 269
Sputtering	S-18	AD-433 506
Stabilization	S-21	NASA-TN-D-2144
Stabilization systems	S-34	NASA-TN-D-2190
Stainless steel	S-13	ORNL-TM 598
	S-25	TID-19155
		TID-19156
		TID-19157
		TID-19160
	S-35	AD-425 604
	S-36	PB-171 809-5
	S-40	MSAR-63-117
	S 48	GEAP-4155
	S-49	N64-16738
Star trackers	S-22	AD-294 927
STARS project	S-22	AD 294 927
Statistical processes	S 23	AD-426 466
Steam	S-56	GEAP-4258
Steam pipes	S-19	NAS-NRC-1144
Steel	S-35	AD-425 604
	S-37	AD-423 526
		AD 425 948
	S-47	WAPD-T-1570
	S 49	N64-16763
	S-50	SWRI-5-1348-1
Steroids	S 3	PB-165 281
Storage batteries	S-16	AD 427 070
		AD-429 135
Storage tanks	S-22	NASA-TN-D-1989
Storage tubes	S 16	AD-421 054
Stress preeenting agents	S-36	AD-424 466
Stresses	S-33	NASA-TN-D-2260
	S-50	ORNL-TM-483
Strontium	S-5	HW-SA-2613
	S-41	HW-SA 2982
	S-44	RAI-104
Structural properties	S-29	AD-424 861
Structures	S-21	PB-165 298
Styrene plastics	S-40	CONF-14-21
Subcritical assemblies	S-49	CONF-133-1
Subject indexing	S-57	AD-428 423
		PB-165 262
		PB-165 263
		UCRL-7554
	S-58	NAS-NRC-1148
Subminiature electronic equipment	S-18	AD-433 506
Sulfamic acids	S-9	TID-16387
Superconductivity	S-18	N64-16750
Superconductors	S-16	LADC-5418
Supersonic flow	S-34	NASA-TN-D-2221
Surface active substances	S-9	AD-423 556
Swimming pool reactors	S-50	CONF-39-44
Swine	S-5	HW-SA-2613
	S-6	HW-SA-2626
Systems for nuclear auxiliary power	S-47	NAA SR-MEMO-7789
Tables	S-34	NASA-TN-D-2221

Subject	Page	Number
Tantalum	S-18	AD-433 506
	S-35	AD-424 604
	S-37	AD-421 905
	S-38	AD-423 952
		AD-426 344
Tantalum alloys	S-38	AD-426 255
		AD-426 344
Tantalum carbide	S-39	AD-425 547
Tantalum diboride	S-27	AD-428 006
Taste	S-24	PB-163 600
Teaching amachines	S-32	AD-419 160
Teapot operation	S-21	PB-165 298
Telemeter systems	S-18	AD-421 951
Telemetering anrennas	S-52	AD-428 310
Telstar	S-21	NASA-SP-32, v. 1
		NASA-SP-32, v. 2
		NASA-SP-32, v. 3
Tensile properties	S-11	WAPD-T-1482
	S-35	WAPD-T-1431
	S-48	HW-74955
Test equipment	S-25	AD-421 973
	S-26	CONF-112-3
	S-29	AD-424 863
Test facilities	S-49	N64-16756
Test sets	S-13	AD-429 924
Thallium	S-9	SC-4972(RR)
Thermal insulation	S-29	AD-426 294
Thermal neutrons	S-41	GA-3298
Thermal radiation	S-43	PB-165 296
		PB-165 297
Thermal stresses	S-33	UCRL-13042(Rev.)
Thermalization	S-41	CONF-39-46
Thermionic converters	S-15	AD-426 882
	S-16	NASA-TN-D-2119
		NASA-TR-R-192
Thermionic emission	S-8	LADC-5128
Thermoluminescence	S-47	TID-19112
Thermophototropism	S-10	NASA-TN-D-2258
Thorium	S-44	ORNL-TM-464
Thorium oxide	S-39	AD-425 547
Thrust vector control systems	S-24	N64-16754
Thyroid gland	S-6	CONF-66-6
Titanates	S-10	NASA-TN-D-2258
	S-53	TID-19071
Titanium	S-35	AD-425 604
	S-43	TID-16522
Titanium alloys	S-36	PB-171 809-5
	S-37	AD-421 029
	S-38	AD-426 255
		AD-426 264
	S-39	AD-427 343
Titanium diboride	S-27	AD-428 006
Topology	S-31	PB-165 261
Tracer studies	S-2	TID-19250
	S-3	TID-18990
	S-49	N64-16763
Tracking	S-1	NASA-CR-21
Training devices	S-32	AD-419 160
Transducers	S-18	AD-421 951
Transition elements	S-35	IS-513
Transuranium elements	S-7	TID-16595
Triphenyl	S-7	CONF-76-5
Tropical deterioration	S-26	AD-422 028
Tumbler-Snapper operation	S-43	PB-165 296
		PB-165 297
Tuned circuits	S-18	N64-16107
Tungsten	S-35	AD-425 604
	S-37	AD-421 905
	S-38	AD-423 952
	S-39	AD-425 474
		AD-425 547
Tungsten alloys	S-38	AD-426 255
		AD-426 264
	S-39	AD-425 547
		AD-425 922
Ultraviolet absorbers	S-30	AD-416 633
Ultraviolet radiation	S-5	BNL-6202
	S-30	AD-416 633
Underground antennas	S-14	PB-165 274
		PB-165 275
Underground explosions	S-21	PB-165 298
	S-23	CONF-84-2
		PB-165 299
Underground structures	S-19	NASA-NRC-1144
Uranium	S-3	TID-16090
	S-7	HW-SA-2645
		HW-SA-2663
	S-9	SC-4972(RR)
		TID-19229
	S-40	LADC-5851
		WAPD-T 1506
	S-42	UCRL-6926
	S-44	ORNL-TM-464
	S-48	CONF-39 64
	S-49	CONF-39-59
		NMI-7009
Uranium alloys	S-49	NMI-7009
Uranyl radicals	S-9	ORNL-TM-358
Urine	S-3	TID-16090
V particles	S-41	EFINS-63-39
	S-45	EFINS-63-29
Vallecitos superheat reactor	S-48	GEAP-4277
Vanadium alloys	S-38	AD-426 255
	S-39	AD-427 343
Vapor pressure	S-7	BNL-6279
Vaporization	S-9	CONF-20-5
Varactor diodes	S-17	PB-165 302
	S-18	N64-16107
Variable capacitors	S-17	PB-165 302
Vegetables	S-29	AD-426 294
Venturi tubes	S-49	N64-16756
		N64-16764
Vestibular habitation	S-4	N64-16330
Viruses	S-4	TID-17884
Viscoelasticity	S-56	PB-165 255
Vortices	S-33	PB-165 276
		PB-165 285
Vulcanizates	S-26	AD-422 028
Warning systems	S-17	AD-425 361
Waste processing	S-13	ORNL-TM-541
	S-44	ORNL-TM-595
	S-44	RAI-104
Water	S-42	UCRL-6967
	S-44	CONF-11-5
Watertight fittings	S-19	AD-423 688
Waveguides	S-13	N64-16110
	S-17	PB-165 256
Welding	S-18	N64-15963
	S-25	TID-19155
		TID-19156
		TID-19157
		TID-19160
	S-36	CONF-94-5
	S-37	AD-421 029
		AD-421 905
Welds	S-39	AD-425 922
	S-50	SWRI-5-1348-7-1
Whiskers (Single crystals)	S-26	AD-422 242
		AD-426 365
Wind tunnels	S-53	AD-423 323
X ray difraction analysis	S-7	CONF-20-18
X-rays	S-47	TID-19112
Yeasts	S-5	HW-SA-2570
		UCRL-11191
Ytterbium	S-7	UCRL-10332
Yttrium	S-6	UCRL-10215
	S-9	CONF-20-22
Zinc	S-8	NYO-10552
	S-55	AD-427 081
Zircaloy-2	S-37	TID-16475
	S-48	HW-74955
	S-50	ORNL-TM-483
		TID-16476
Zirconates	S-53	TID-19071
Zirconium alloys	S-35	BBC-119
	S-37	TID-16475
	S-38	AD-426 255
		AD-426 264
	S-39	AD-427 343
Zirconium diboride	S-27	AD-428 006
ZTA graphite	S-27	AD-427 104

U.S. DEPARTMENT OF COMMERCE FIELD OFFICES

SERVE THE BUSINESS COMMUNITY

The Department of Commerce maintains Field Offices to enable the business community to avail itself locally of Government facilities designed to promote commerce. Working closely with various units in the Department and, when necessary, with other Government agencies, the Field Offices provide business services to manufacturers, wholesalers, retailers, trade publications, trade associations, advertising agencies, research groups, financial institutions, and exporters and importers.

Experienced personnel will gladly assist in the solution of specific problems, explain the scope and meaning of regulations administered by the Department, and provide practical assistance in the broad field of domestic and foreign commerce. Field Offices act as official sales agents of the Superintendent of Documents, and maintain an extensive business reference library containing periodicals, directories, publications and reports from official as well as private sources.

Among the many services which businessmen have found of value are:

GENERAL

- Management and business aids
- Establishing a new business

BASIC ECONOMIC DATA

- Census data with national and often State and regional breakdowns, on manufacturing wholesaling, retailing, service industries, employment and unemployment, population, housing, agriculture
- Basic records of national income and product, regional trends, balance of payments, foreign aid

MARKETING AND DISTRIBUTION

- Development and maintenance of markets
- Distribution channels, facilities and services
- Marketing and distribution statistics

PRODUCTION

- Modernization of plant processes and other technological aids
- Development of new products
- Government-owned patents for free license
- Commodity standards

FOREIGN TRADE AND INVESTMENT

- Tariff and exchange regulations
- Import and export quotas, licensing regulations
- Statistics on imports and exports
- Investment and trade opportunities abroad
- Economic conditions in foreign countries

COOPERATIVE OFFICES

To make the services of the Department of Commerce more widely available, agreements have been entered into with more than 750 Chambers of Commerce, Manufacturers Associations, and similar business groups under which these organizations have become official Cooperative Offices of the Department. If specific information is not on hand in the Cooperative Office, your problem will be referred to the nearest Departmental field office.

Department Field Offices

Albuquerque, N. Mex., 87101, U.S. Courthouse. 247-0311.
Anchorage, Alaska, 99501, Room 306, Loussac-Sogn Building. Phone: BR 2-9611.
Atlanta, Ga., 30303, 75 Forsyth St., N.W. JAckson 2-4121.
Birmingham, Ala., 35203, Title Bldg., 2030 Third Ave., North. Phone: 323-8011.
Boston, Mass., 02110, Room 230, 80 Federal Street. CApitol 3-2312.
Buffalo, N.Y., 14203, 504 Federal Building, 117 Ellicott St., TL 3-4216.
Charleston, S.C., 29401, No. 4 North Atlantic Wharf. Phone: 722-6551.
Charleston, W. Va., 25301, 3002 New Federal Office Bldg., 500 Quarrier St. Phone: 343-6196.
Cheyenne, Wyo., 82001, 207 Majestic Bldg., 16th & Capitol Ave. Phone: 634-2731.
Chicago, Ill., 60606, Room 1302, 226 West Jackson Blvd. 828-4400.
Cincinnati, Ohio, 45202, 809 Fifth Third Bank Bldg., 36 E. Fourth Street. 381-2200.
Cleveland, Ohio, 44101, 4th Floor, Federal Reserve Bank Bldg., East 6th St. & Superior Ave. 241-7900.
Dallas, Tex., 75202, Room 1200, 1114 Commerce St. Riverside 8-5611.
Denver, Colo., 80202, 142 New Custom House, 19th & Stout Street. 534-4151.
Detroit, Mich., 48226, 445 Federal Bldg. 226-6088.
Greensboro, N.C., 27402, Room 407, U.S. Post Office Bldg. 273-8234.
Hartford, Conn., 06103, 18 Asylum St. Phone: 244-3530.
Honolulu, Hawaii, 96813, 202 International Savings Bldg., 1022 Bethel St. Phone: 588874.
Houston, Tex., 77002, 5102 Federal Bldg., 515 Rusk Ave. CA 8-0611.
Jacksonville, Fla., 32202, 512 Greenleaf Building, 204 Laura Street. ELgin 4-7111.
Kansas City, Mo., 64106, Room 2011, 911 Walnut Street. BAltimore 1-7000.
Los Angeles, Calif., 90015, Room 450, Western Pacific Bldg., 1031 S. Broadway. 688-2830.
Memphis, Tenn., 38103, 345 Federal Office Bldg., 167 N. Main Street. Phone: 534-3214.
Miami, Fla., 33132, 408 Ainsley Bldg., 14 N.E. First Ave. FRanklin 7-2581.
Milwaukee, Wis., 53203, Straus Bldg., 238 W. Wisconsin Ave. Phone: BR 2-8600.
Minneapolis, Minn., 55401, Room 304, Federal Bldg., 110 South Fourth Street. Phone: 334-2133.
New Orleans, La., 70130, 1508 Masonic Temple Bldg., 333 St. Charles Avenue. Phone: 527-6546.
New York, N.Y., 10001, 61st Fl., Empire State Bldg., 350 Fifth Ave. LOngacre 3-3377.
Philadelphia, Pa., 19107, Jefferson Building, 1015 Chestnut Street. WAlnut 3-2400.
Phoenix, Ariz., 85025, New Federal Bldg., 230 N. First Avenue. Phone: 261-3285.
Pittsburgh, Pa., 15222, 1030 Park Bldg., 355 Fifth Avenue. 471-0800.
Portland, Oreg., 97204, 217 Old U.S. Courthouse, 520 S.W. Morrison Street. 226-3361.
Reno, Nev., 89502, 1479 Wells Avenue. Phone: FA 2-7133.
Richmond, Va., 23240, 2105 Federal Building, 400 North 8th Street. Phone: 649-3611.
St. Louis, Mo., 63103, 2511 Federal Building, 1520 Market Street. MAin 2-4243.
Salt Lake City, Utah, 84101, 222 S.W. Temple St. 524-5116.
San Francisco, Calif., 94111, Room 419, Customhouse, 555 Battery St. YUkon 6-3111.
Santurce, Puerto Rico, 00907, Room 628, 605 Condado Ave. Phone: 723-4640.
Savannah, Ga., 31402, 235 U.S. Courthouse and Post Office Bldg., 125-29 Bull Street. ADams 2-4755.
Seattle, Wash., 98104, 809 Federal Office Bldg., 909 First Avenue. MUtual 2-3300.

UNIVERSITY MICROFILMS INC
313 N FIRST STREET
ANN ARBOR MICHIGAN
GRR JUNE

PENALTY FOR PRIVATE USE TO AVOID
PAYMENT OF POSTAGE, $300

GOVE
DIVISION OF PUBLIC DOCUMENTS
WASHINGTON, D.C. 20402

OFFICIAL BUSINESS